Nov. 1930

Electrical Manufacturing

Vol. 6 A Gage Publication No. 5

INDUSTRIAL RELATIONS LIBRARY OF COMMERCE
NOV 21 1930

QUALITY WIRES FOR QUALITY PRODUCTS

Make your product safe, dependable, unfailing. Use electrical wires... the "nerves" of your product... that bear the Anaconda name and trade mark—*the standard of quality!*

ANACONDA
from mine to consumer

REG. U.S. PAT. OFF.

Anaconda safeguards quality from mine to consumer—provides a nation-wide service, prompt, dependable, complete.

ANACONDA WIRE AND CABLE COMPANY

STANDARD EQUIPMENT ON:

PORTABLE PROJECTORS

WASHING MACHINES

HEATER CORD SETS

IRONERS

VIOLET RAY LAMPS

EXERCISERS

FANS

ELECTRIC PHONOGRAPHS

FLOOR MACHINES

RADIO SPEAKERS

« « « are used each year by the leading manufacturers of electrical appliances

Gone are the days of the old breakable plug! The Belden *Plug Unbreakable for Things Electrical* eliminates the inconvenience of broken and bent plugs that once had to be tolerated.

Hundreds of manufacturers have already adopted the nationally advertised Belden Soft Rubber Plug as standard equipment for their products. It is used on all types of electrical appliances.

You, too, can easily provide your appliances with the powerful sales and service advantages of the Belden Unbreakable Soft Rubber Plug. Write today for illustrated booklet entitled, "The Plug Unbreakable for Things Electrical."

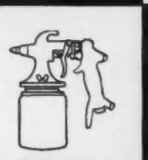
Belden Manufacturing Company
4633 West Van Buren Street, Chicago

Belden
SOFT RUBBER PLUG

STANDARD EQUIPMENT ON:

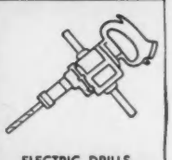
RADIO SETS

VACUUM CLEANERS


SPRAYERS

REFRIGERATORS

BUSINESS MACHINES


ELECTRIC DRILLS

LAMPS

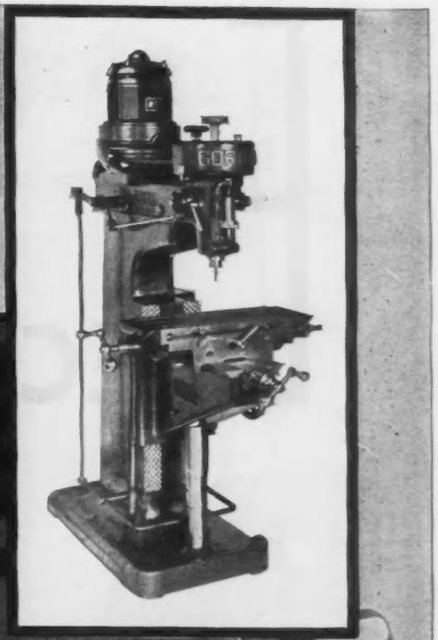
JUICE EXTRACTORS

KITCHEN MIXERS

and many more

The Plug Unbreakable for Things Electrical

POWER and SYMMETRY *Combined*



The ideal application of a motor to a machine frequently involves more than merely selecting the proper size and type. Time after time Master Engineers—regarding machine and motor as forming a single efficient unit—have made substantial contributions to the operation and appearance of a complete device in cooperation with our customers' engineers. Sometimes a slight change in method of mounting the motor is sufficient; again our engineers may suggest redesign of some features of the machine itself where such changes will produce a better motor drive. Their goal is to secure the greatest efficiency, a harmonious, compact design and the minimum production cost. We would be glad to investigate the possibilities in connection with your product.

THE MASTER ELECTRIC COMPANY
DAYTON, OHIO

STOCKS CARRIED IN PRINCIPAL CITIES

MORE THAN 100 SERVICE STATIONS

MASTER GUARANTEED MOTORS

1/30 TO 10 H.P. Dayton THE MASTER ELECTRIC CO. Ohio *Not More Than 40°*

ELECTRICAL PARTS

promptly and accurately »

FORMICA for electrical uses is made in every variety required for insulating purposes in devices of all kinds.

Manufacturers who do their own fabricating may get the characteristics they require in Formica sheet.

Those who buy fabricated parts may have them in quantity accurately shaped very promptly, for Formica has one of the largest installations of fabricating machinery in the industry.

For seventeen years leading American technical organizations have depended on Formica as a source of supply for these materials.

Send your blue prints for quotations.

THE FORMICA INSULATION COMPANY
4638 Spring Grove Avenue
Cincinnati, Ohio

FORMICA

©C1B 94306

Electrical Manufacturing

Reg. U. S. Patent Office

Volume 6 NOVEMBER, 1930 Number 5

Stanley A. Dennis,
Editorial Director, Gage Publications

Leon I. Thomas, Editor

Roger L. Knight
Associate Editor

Leslie H. Allen
Associate Editor

W. Harvey Cooke
News Editor

Lloyd W. Dunn
Art Editor

Electrical Manufacturing's editorial program has the following objectives:

Production

To help all electrical manufacturers, including makers of motor-driven products, increase the product's salability, cut unit production costs, quicken turnover, reduce overhead expenses, establish standard methods of work, and spread a better knowledge of raw materials and parts.

Marketing

To spread a better knowledge of and aid electrical manufacturers in adjusting sales management to the buyers' market, to aid in making advertising more effective, finding the most profitable distribution channels, and promoting cooperative market development.

Administration

To further the working out of sounder management policies and better executive control, coordinating sales and production schedules, promoting research, and developing better industry relations.

Repairing

To help all motor repair shops to build better business by developing a sounder organization, improving management, policies and methods, and developing a keener merchandising point-of-view on the business.

Contents for This Issue

Self-Restraint in Business.....Clarence L. Collens 37

He Trained Electricity to Do the Cooking—A Personality Sketch of George A. Hughes.....Lyman Anson 40

When Oilless Bearings "Fill the Bill"..... 43

Selecting Motors for Portable Tools.....B. H. Chatto 44

Exporting to Chile.....Wilbur T. Gracey 47

Perhaps Pressed Metal Is the Answer..... 51

A Tack is a Tack—But when skillfully photographed with dramatic lights and shadows, the commonplace tack becomes a vibrant eye-arresting article
Lloyd W. Dunn 52

Motor Repair Hints..... 57

Ready to Apply..... 59

Editorials..... 61

Here is a Market for Electric Motor and Control Equipment..... 62

Electrical Materials Commonly Used—TAPE.....William Crawford Hirsch 64

NEMA News..... 67

Facts, Figures and Trends..... 68

What is It Made of? A Small Kitchen mixer..... 72

Electrical Manufacturing News..... 74

Patent News..... 82

New Goods for Your Inspection..... 88

Index of Raw Materials, Parts and Electrical Equipment..... 94

Electrical Manufacturing does not publish any news or comment relating to either personal or patent controversies.

Signed articles express the thought of the contributor, but not necessarily that of the editor or publisher.

Published Monthly and Copyrighted by

The Gage Publishing Company, Inc.

Nelson W. Gage
President

J. F. McClure
Vice-Pres. and Secretary

J. C. Prior
Treasurer

Stanley A. Dennis
Editorial Director and Assistant to President

L. C. Fletcher
Advertising Manager

461 Eighth Avenue, New York, N. Y.

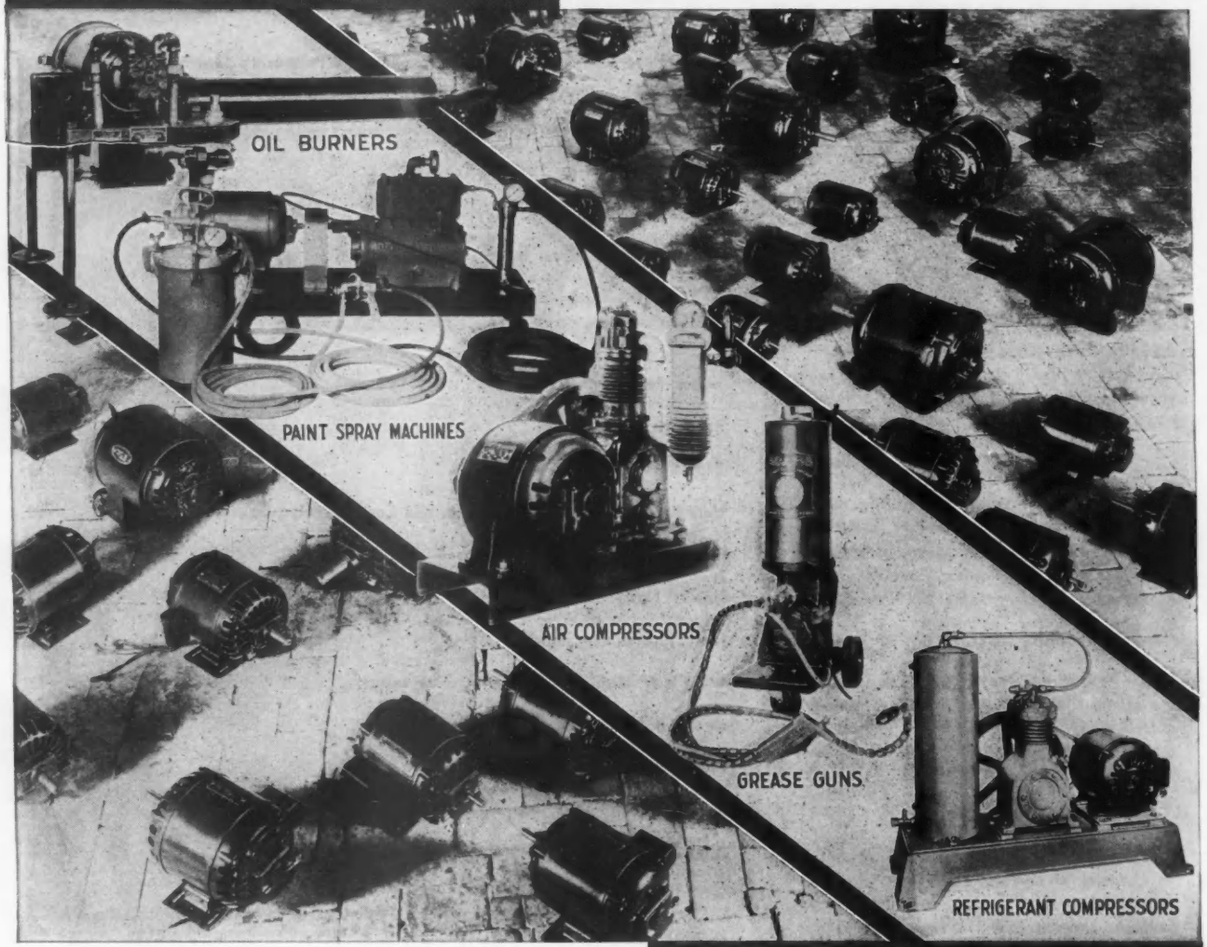
Chicago Office: 731 Monadnock Block, L. C. Bassett, Manager **Cleveland Office:** 501 Caxton Building, Harry Krohn, Manager

Subscription Rates: United States, Canada, Mexico, $2.00 a year. Foreign Countries, $3.00 a year. 25 cents a copy.

Gage publications are: **Electrical Installation Record, Electrical Manufacturing, Electrical Specifications, Metropolitan Electrical News, Gage Electrical Encyclopedia**

Reliable motors for reliable machines

Motors are as important as any other items making up motor driven appliances. The best designed oil burners, paint spray machines, air compressors, grease guns and refrigerant compressors become unfit for service when the motors fail. » » » Unfortunately, the user does not and cannot differentiate between motor and machine. To him a breakdown is a breakdown, irrespective of whether the motor or the motor-driven unit is to blame—and it is the machine manufacturer and not the motor manufacturer who is invariably held responsible.



Wagner realizes the importance of motor reliability. Wagner appreciates the machine manufacturer's responsibility to the user. That is why Wagner takes every precaution possible in the design and construction of motors to anticipate even abnormal operating conditions. » » » And that is why an ever increasing number of manufacturers consult Wagner in order to make sure that the motor is of the right type and size, and that it is correctly designed and built for the machine in question. » » »

Wagner
Electric Corporation
6400 Plymouth Avenue, Saint Louis, U. S. A.

MOTORS	TRANSFORMERS	FANS
SINGLE-PHASE	DISTRIBUTION	DESK WALL
POLYPHASE	POWER	CEILING
DIRECT CURRENT	INSTRUMENT	VENTILATING

S231-2XC

TORRINGTON
BALL BEARINGS ARE ON THE JOB

FROM DRINK MIXERS TO MULTIPLE DRILLERS

Torrington Ball Bearings have met the test in 113 fields. Perhaps your field is among them . . . but even if it is not, you can know that Torrington will work out your problems with you. Even on very special work, when reasonable quantity makes orders for special machinery worth your while, just put it up to Torrington experts. You know that back of these engineers is the Torrington organization . . . sixty years of precision manufacture . . . a record for bearings of machined exquisite accuracy and dependable performance.

The Torrington Company
ESTABLISHED 1866
Torrington, Conn., U.S.A.

DISTRICT SALES REPRESENTATIVES

The TORRINGTON COMPANY
Curtis Building
2842 W. Grand Boulevard
Detroit Mich.

S. W. ANDERSON
565 W. Washington Blvd.
Chicago, Ill.

THE FINEST STEELS OBTAINABLE ARE USED IN FEDERAL BEARINGS.

THAT IS ONE REASON FOR THEIR OUTSTANDING LEADERSHIP.....

FEDERAL Radial Ball Bearings are made of the finest high carbon chrome steels. This is one of the outstanding reasons for "FEDERAL" superiority. The "FEDERAL" reputation for quality means long and economical service under all service conditions.

FEDERAL Radial Ball Bearings are built with the most exacting care. Continual checking of every operation. Each bearing part and every step in processing is individually tested, inspected and calibrated. FEDERALS are as near perfection as human skill can make them.

"FEDERALS" ARE PRECISION BEARINGS OF THE HIGHEST QUALITY

THE FEDERAL BEARINGS CO., INC.
POUGHKEEPSIE
NEW YORK

Detroit Office—917 Book Bldg.

FEDERAL

▲ ▲ ▲ HOW BODINE MOTORS SERVE AMERICAN MULTIGRAPH MACHINES

MOTOR-DRIVEN office appliances are well known to modern industry. They are important factors in the reduction of clerical overhead.

Bodine Fractional Horsepower Motors have long been used by the American Multigraph Sales Company on their multigraphing equipment. On some machines two Bodine Motors are used, one for driving the type cylinder and the other for the blower which actuates the paper feed. This double motor drive provides perfect control for the rotary press and the feeder.

Office equipment is liable to suffer from neglect and abuse even more than factory machines. It must withstand strenuous treatment in the hands of inexperienced and indifferent operators. Hence, it is not strange that Bodine Motors are used on American Multigraph Machines. Where unfailing performance is imperative, you will find Bodine Motors.

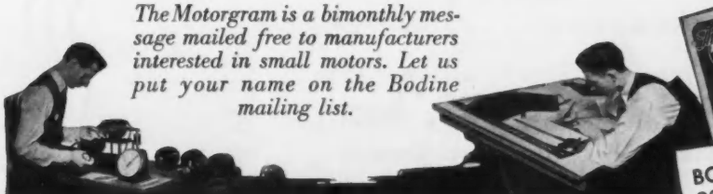
Bodine Type EB-24 D. C. Motor used on American Multigraph Machines.

ENGINEERING SMALL MOTORS!

IN this era of severe competition, when you must provide the maximum advantages at the minimum cost, manufacturers must bear in mind that a low-priced motor is often the most expensive unit in the final analysis. No farsighted manufacturer would sacrifice the performance of his motor-driven machines by selecting motors strictly on a price basis. Bodine Motors are *engineered for your product.* They provide that extra quota of power, durability and performance which makes your machines more salable.

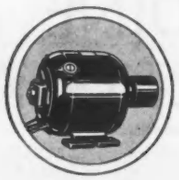
With ratings from 1/1300 H. P. to 1/4 H. P., at all speeds, Bodine Motors deserve serious consideration as driving units for your machines. Send for the new Bodine catalog.

The Motorgram is a bimonthly message mailed free to manufacturers interested in small motors. Let us put your name on the Bodine mailing list.



BODINE MOTORS
ENGINEERED FOR YOUR PRODUCT

BODINE ELECTRIC CO.
2256 W. Ohio Street, Chicago
Please send items checked below:
☐ Bodine Catalog ☐ Motorgram
Name.....
Title.....
Address.....



We Present A Better Substitute *for* Malleable Iron

To SECURE a material of higher magnetic permeability for the frames of our direct current motors and generators, our metallurgists recently succeeded in electro-synthesizing a new ferro-alloy from purest raw materials—and in so doing made a contribution to all industry. Aremite, as this new alloy is known, has twice the tensile strength of grey iron and will cast more intricate patterns than cast steel. It is close-grained, non-porous, solid-cored and easily machineable—a substitute for malleable iron that can be produced in one-sixth the time! We are using Aremite with great success in the frames of our heaviest-duty electric hoists. It is ideal for all heavy-section castings, pressure castings, machine tool castings, punch holders, die shoes, pumps and similar uses. If you are interested in securing better castings in shorter time, let us tell you more about Aremite.

If you have a problem in electrical-motored machinery, come to Robbins & Myers. We offer you the facilities of a completely modern plant, and the experience of 32 years' precision manufacture in designing, building and applying electric motors, generators, fans, and electrical appliances

Partial List of Apparatus to which Robbins & Myers Motors have been successfully applied

Adding Machines
Advertising Displays
Air Compressors
Baker's Machinery
Blowers
Brick Machinery
Car Heaters
Churns
Cloth Cutters
Coffee Mills
Coin Counters
Confectioner's Machinery
Conveyors
Dental Lathes
Dish Washers
Driers
Elevators
Floor Surfacers
Folding Machines
Heaters
Heat Regulators
Hoists
Humidifiers
Ironing Machines
Labeling Machines
Oil Burners
Office Appliances
Organ Blowers
Mailing Machines
Machine Tools
Meat Choppers
Milking Machines
Movie Projectors
Phonographs
Portable Tools
Printing Presses
Pumps
Radio Stations and Receiving Sets
Spray Equipment
Ticket Selling Machines
Vacuum Cleaners
Ventilating Fans
Unit Heaters
Washing Machines
Wrapping Machines

Robbins & Myers, Inc.

Springfield, Ohio **Brantford, Ontario**

1878

1930

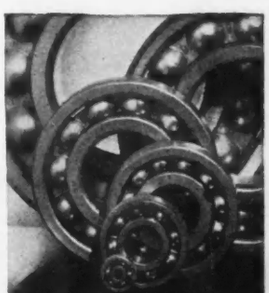
MOTORS, FANS, HAND AND ELECTRIC HOISTS AND CRANES

The motors driving these two oil-purifying machines are Westinghouse, equipped with New Departure Ball Bearings. The maintenance department reports important economies.

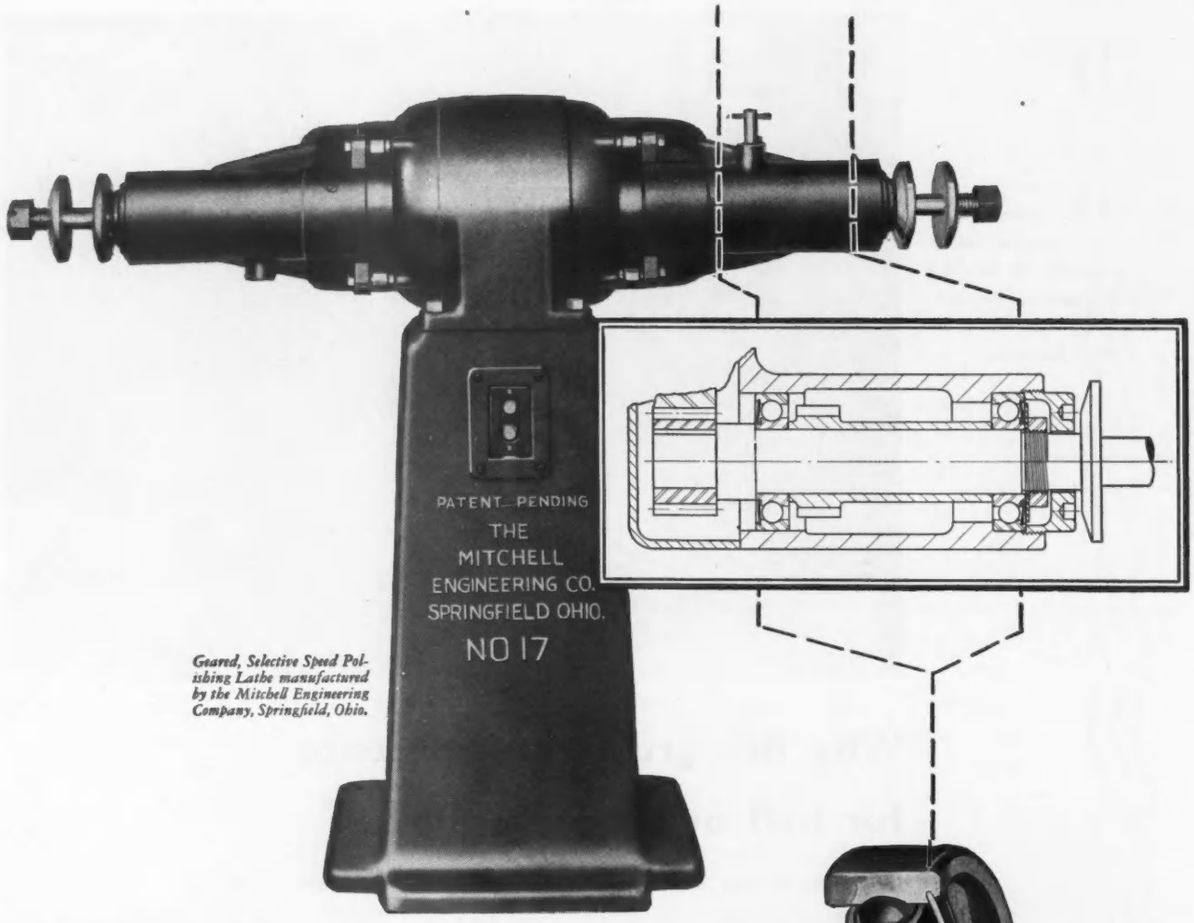
1603

Why this growing preference for ball bearing motors?

It makes a big difference with your maintenance costs whether the inspection crew has to make its rounds of your motors every month or about once a year. That point alone is winning more converts each day to motors equipped with New Departure Ball Bearings. New Departures are as long lived as the motors themselves . . . can be housed to prevent lubricant leakage or entrance of abrasive dust. The rotor cannot sag and rub on stator . . . highest efficiency and power factor are always maintained. Burnouts . . . and bearing replacement costs are greatly reduced. These and many other important savings made with New Departure Ball Bearings are interestingly explained in Booklet K, gladly mailed on request. The New Departure Manufacturing Company, Main Works, Bristol, Connecticut; Detroit, Chicago, San Francisco, London.

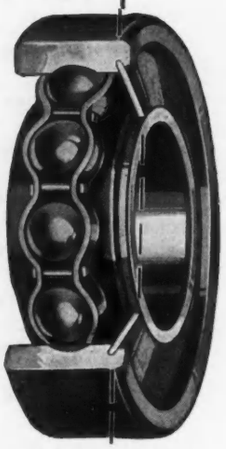


NEW DEPARTURE BALL BEARINGS



Geared, Selective Speed Polishing Lathe manufactured by the Mitchell Engineering Company, Springfield, Ohio.

SRB *Lubri-Seal* Ball Bearings Increase Efficiency of Mitchell Polishing Lathes



THESE sturdy machines are equipped with SRB *Lubri-Seal* Ball Bearings at each end of the wheel spindle.

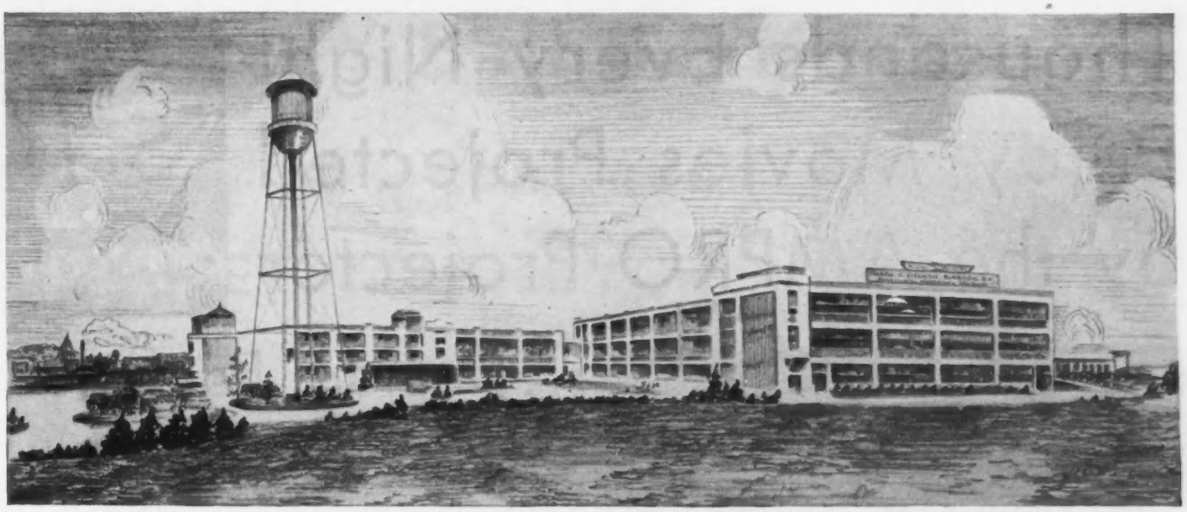
Grease cannot leak out—dirt cannot enter—the bearing housing. Maintenance costs are virtually eliminated with this highly efficient, yet simple mounting.

Let us show you how to *Lubri-Seal* your own product for improved performance.

An SRB Sales Engineer is always available for consultation and cooperation.

STANDARD STEEL AND BEARINGS INCORPORATED
Plainville DIVISION OF MARLIN-ROCKWELL CORPORATION *Connecticut*

Ball SRB Bearings



A New Name for an Old Company

The

BLACK & DECKER ELECTRIC CO.

of Kent, Ohio

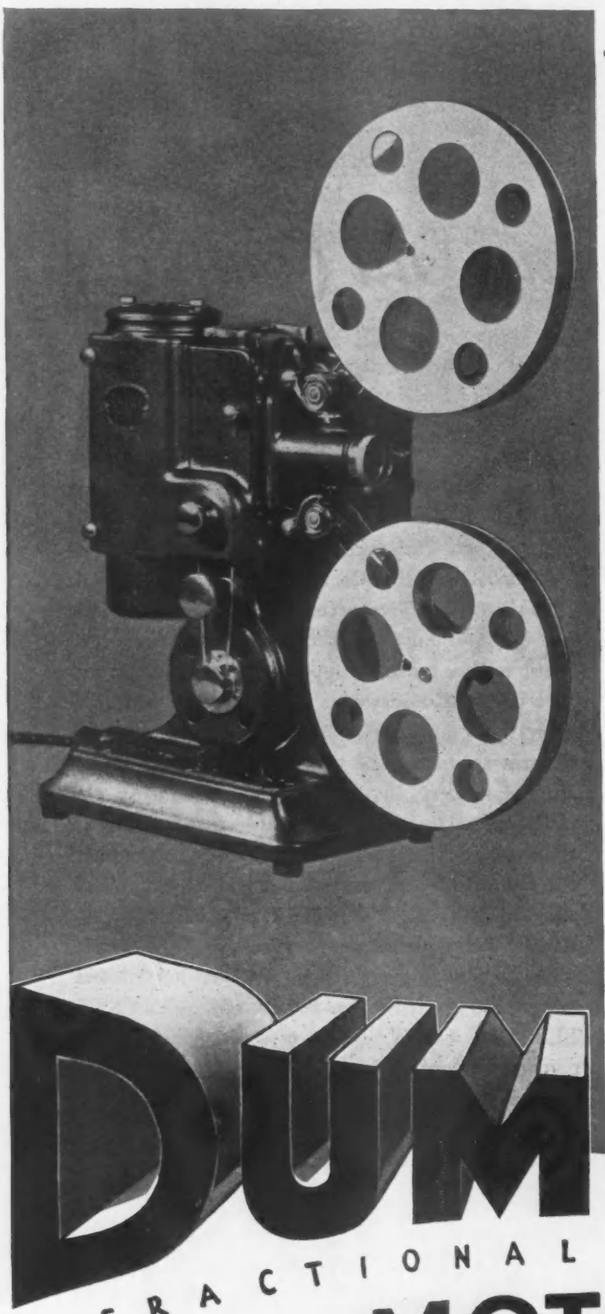
formerly

The DOMESTIC ELECTRIC CO.
of Cleveland and Kent, Ohio

THIS change of name is of major importance to users of fractional horsepower motors. Its significance is three-fold . . . First, that to the former DOMESTIC ELECTRIC COMPANY have been added the broad experience, the financial strength, the extensive resources for engineering, and research, the world-wide distributing and service facilities of BLACK & DECKER . . . Second, that through the resources of BLACK & DECKER but without any major change of policy, every effort will be made to improve and extend the service of the Company . . . Third, that manufacturers of commercial, industrial and household electric appliances or tools may greatly increase their salability by using a motor bearing the BLACK & DECKER nameplate—thus adding to their products the good will, the ready acceptance, the reputation for honest value and dependability that all BLACK & DECKER products have enjoyed for more than twenty years . . . Manufacturers of devices powered by fractional horsepower motors are invited to use the BLACK & DECKER ELECTRIC COMPANY as a department of their own organizations—to analyze their motor problems as individual problems, and to recommend or design BLACK & DECKER ELECTRIC MOTORS exactly suited to their requirements.

BLACK & DECKER
FRACTIONAL HORSEPOWER
Electric Motors

Thousands Every Night Enjoy Movies Projected by the AMPRO Projector



. . . Dumore Equipped

The Ampro Precision Projector is acknowledged, throughout the motion picture industry, to be a decided advancement in 16 m. m. projector design. The Ampro makes four claims to distinction: superior illumination, permanent steadiness, practical silence, and greater ease of control.

To help achieve this high standard of excellence, the Ampro Corporation of Chicago selected the Dumore Motor as standard equipment.

Dumore features of construction encouraged this choice. Correct design, precision construction of the highest degree, dynamic balance of armatures, permanent freedom from vibration and Dumore Engineering Service supplied all the requirements demanded by Ampro Corporation standards.

If your product requires fractional horsepower, it will pay you to investigate Dumore Motors.

THE DUMORE COMPANY
35 Sixteenth St. Racine, Wisconsin

DUMORE

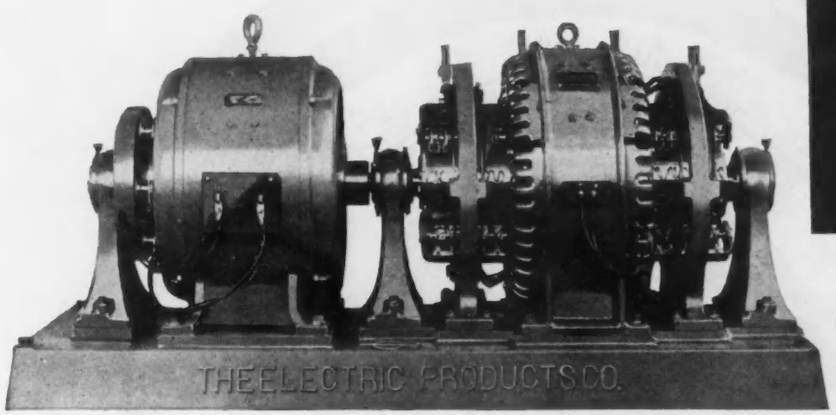
FRACTIONAL HORSEPOWER

MOTORS

GURNEY Ball Bearings

Guarantee continued

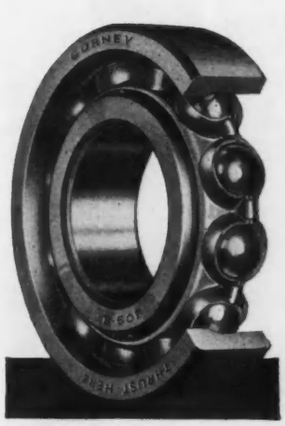
HIGH EFFICIENCY . . .



• *This 40 H.P. Motor Generator Unit—Gurney Ball Bearing equipped—is manufactured by the Electric Products Company, Cleveland, Ohio.*

THERE are two reasons why Gurney Ball Bearings are used on the motor and generator units of the Electric Products Company. First–the maintenance cost on Gurney Ball Bearing equipment is exceedingly low. Second–their presence represents a guarantee of lasting high efficiency.

The records of Gurney service in Electric Products equipment show that simple but effective sealing has eliminated burnt-out bearings and armature troubles due to oil-soaked windings; that operating expense, including lubrication and maintenance, has been kept at a minimum.

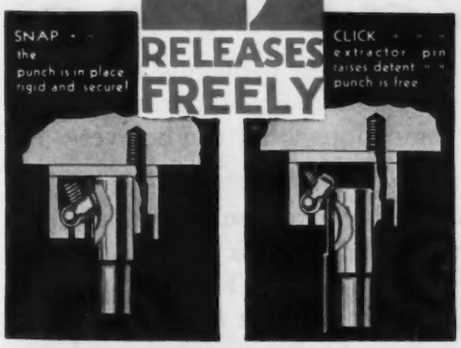


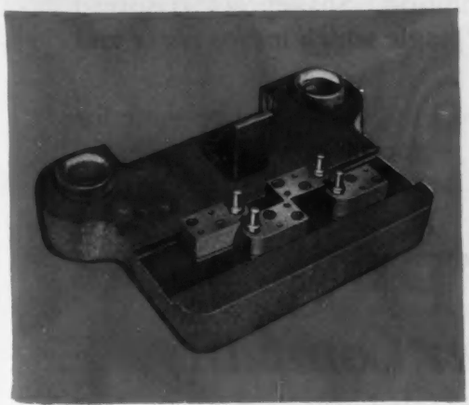
Gurney Ball Bearings will give life-long service when operated within their rated capacity. Such dependability becomes doubly effective when it carries with it important savings in operating and maintenance expense and a guarantee of continued high efficiency. GURNEY BALL BEARING DIVISION, Marlin-Rockwell Corp., Jamestown, N. Y.

GURNEY BALL BEARINGS

WESTON ELECTRICAL INSTRUMENT CORPORATION
582 Frelinghuysen Avenue Newark, N. J.

How HERCULES INTERCHANGEABLE PUNCHES AND RETAINERS LOWER PRODUCTION COSTS





Retainers fitted to regular die shoe

This modern new system of punches lowers production costs by practically eliminating "down-time" of machines and reducing die expense.

Hercules Interchangeable Punches are rigidly held in perfect alignment with the die buttons at all times, thus prolonging the life of their keen shearing edges. They will not bind or jam in the retainer and are always easily removed.

Should it become necessary to change punches they are instantly replaced without removing the die from the press—production is never interrupted for more than a moment—costly "down-time" and maintenance work is reduced to a minimum—the savings mean lower costs and greater profits.

This system of punches is applicable to practically every punching operation—let our service engineers show you how to put it to use.

W&B TESTED AND PROVED

Full details in catalog No. 94—write for a copy today and get the complete facts—they will lead the way to lower costs and increased profits.

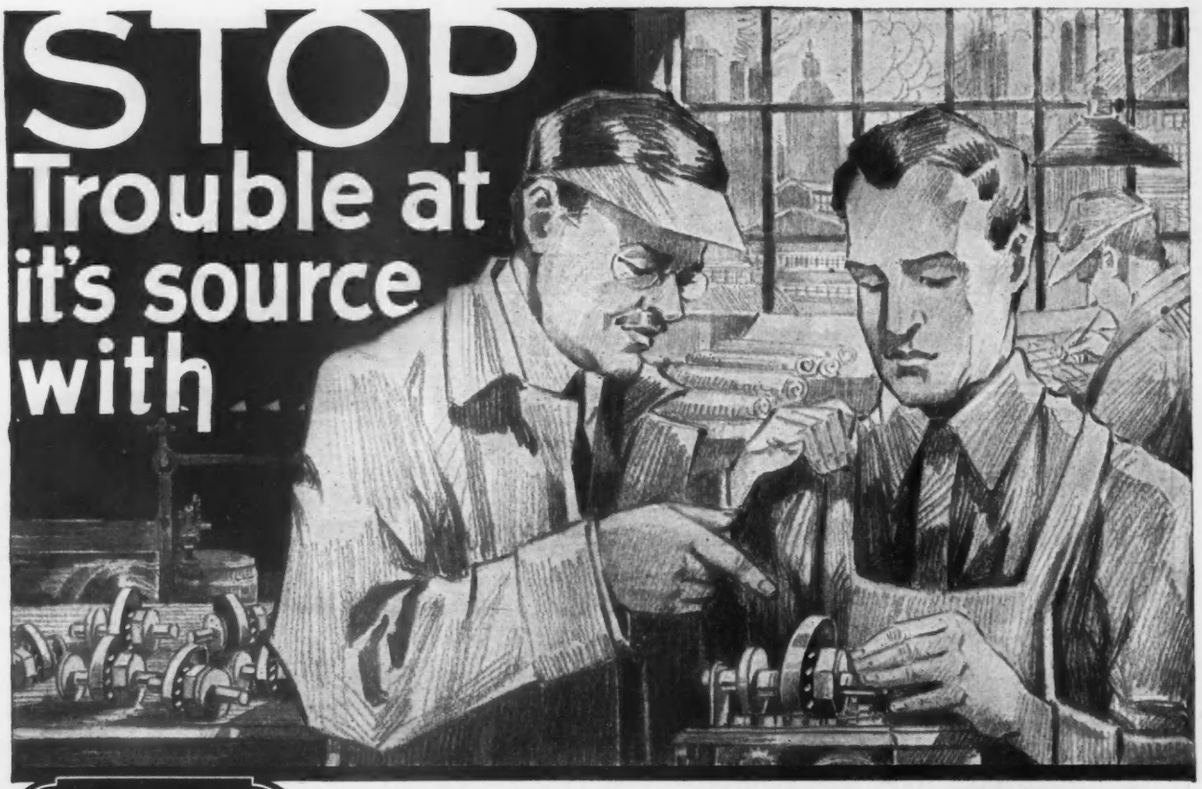
WHITMAN & BARNES

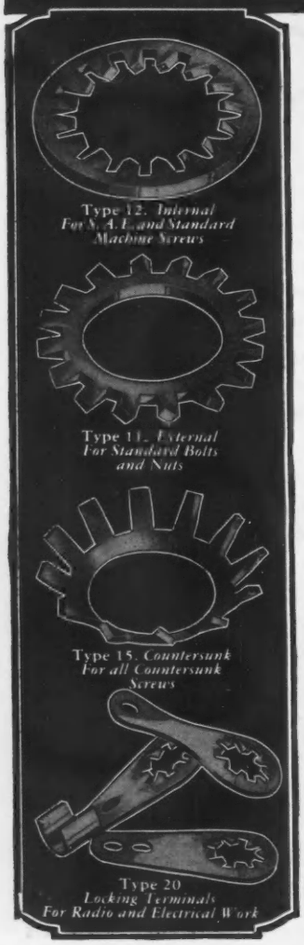
INCORPORATED

NEW YORK DETROIT CHICAGO

MAKERS OF FINE TOOLS FOR 76 YEARS

STOP Trouble at it's source with...





U. S. Patents: 1,419,504
1,804,122—1,887,954
Other patents pending.
Foreign patents.

SHAKEPROOF
Lock Washers

FAILURE to provide protection from the damaging action of vibration is costing industry hundreds of thousands of dollars. A large part of this tremendous waste can be overcome by greater care in designing and manufacturing.

Nuts and screws that are not tightly locked on soon shake loose—and then trouble starts. That's why it pays to use Shakeproof Lock Washers on your products. Their twisted steel teeth form a multiple lock that will not loosen even under the most intense vibration. Shakeproof is spread proof, too, and they cannot tangle which means faster and neater assembly work.

Test Shakeproof Lock Washers in your own shop—see for yourself how they improve performance and add to the life of any product. Liberal samples will be sent on request—write for a supply today!

SHAKEPROOF
Lock Washer Company

"It's the Twisted Teeth that LOCK"

{Division of Illinois Tool Works}

2533 N. Keeler Avenue, Chicago, Illinois

GET THIS BOOK!

it demonstrates the

4-FOLD ADVANTAGE

of proper packaging

1. SALES INFLUENCE
2. CONVENIENCE
3. PROTECTION
4. ECONOMY

Proper Packaging has a 4-Fold Advantage

H & D

RIGHTLY designed, your package will meet four definite requirements. It will give *complete protection* to your product in shipping or storage—it will be *convenient to handle* in packing or unpacking—it will be *low in cost*—it will make a *favorable, sales-inducing impression* on your customers.

H & D corrugated fibre shipping boxes have this four-fold advantage. They are scientifically designed and built by the world's largest packaging organization, with years of experience in solving the packing problems of shippers in all lines of business.

"How to Pack It," the latest booklet issued by the H & D Package Engineers, will give you some interesting information on packaging your product. Mail the coupon below and a copy will be sent without charge.

H & D Package Engineers are ready to help you benefit by the economies to be effected by a replan of your shipping boxes. They have the experience of the world's largest packaging organization to draw upon.

THE HINDE & DAUCH PAPER COMPANY
325 DECATUR STREET SANDUSKY, OHIO

Western Address:
KANSAS CITY FIBRE BOX CO.
PACKERS STATION KANSAS CITY, KANSAS

Canadian Address:
KING STREET SUBWAY AND HANNA AVE. TORONTO

HINDE & DAUCH corrugated fibre SHIPPING BOXES

THE HINDE & DAUCH PAPER COMPANY
325 Decatur Street, Sandusky, Ohio

Please send me a copy of "How to Pack It."

Signature..... We Pack.....
Company Name.....
Address.....
City..... State.....

GET THIS BOOK

SEND THIS COUPON !

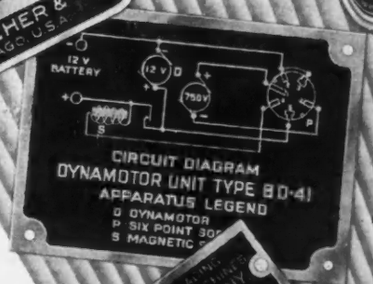
CROWE

A COMPLETE LINE OF NAME PLATES for Every Electrical Use

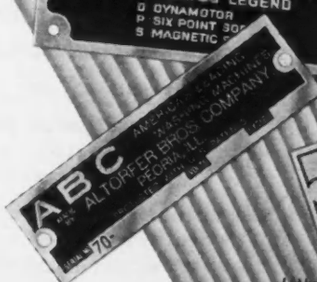
Coin embossed plates are finest name plates in industry of today.

Alumilite plates are desirable where high lustre, smooth finish is required.

Specially formed plates for every purpose. Legs made to eliminate rivets if desired.



Etched plates of every description produced on any metal, in any finish.



Lithographed plates of all kinds round out the Crowe line. Very effective, yet inexpensive.

Convince yourself of our ability to handle your needs by stopping at the Crowe plant when you are in the vicinity next. Our facilities for producing *all* kinds of name plates in any quantity are second to none

. . . . . Many leaders in the Electrical Industry depend on Crowe to handle their name plate problems.

All types of name plates are available to the electrical trade through Crowe:

Embossings . . . Crowe "coin embossing" is the standard for fine quality embossed plates the country over.

Etchings . . . Etched name plates by Crowe are recognized everywhere as the best available. Crowe etched plates can be furnished in any metal or combination of color and finish.

Alumilite . . . This is a new process exclusive with Crowe name plates for producing a smooth, high-lustre lacquer-less finish that does not scratch or mar easily, and that will resist certain types of corrosion and heat unusually well.

Lithographings . . . Crowe lithographed plates, dials and scales may be colorful and are well made at a low price.

. . . . . .

A complete Designing and Engineering Department is at your disposal in planning your new name plates. Fill out the attached coupon so that we may more intelligently discuss your problems with you. There is no obligation.

CROWE NAME PLATE & MFG. CO.
1751 Grace Street .. Chicago

Gentlemen—We are interested in the following:

☐ 1. Embossed Plates ☐ 3. Etched Plates
☐ 2. Alumilite Plates ☐ 4. Lithographed Plates

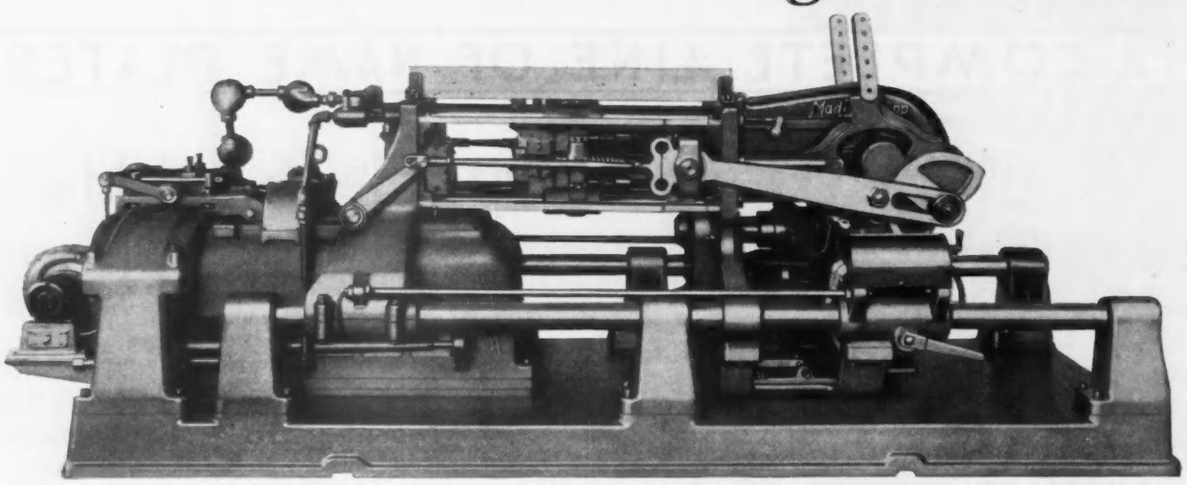
It is understood that filling out this coupon incurs no obligation.

Name .....

Address .....

.....

UNIVERSAL . . .
a Wider Range of Work



with the New
Madison-Kipp Die Casting Machine

This new Madison-Kipp Die Casting Machine 12″ x 16″, is a modern, refined machine tool, designed for larger work, a larger range of work, and increased production in multiple cavity dies.

Although it is larger and more massive—6 tons—it is—like the Madison-Kipp 10″ x 14″—a fully automatic, precision machine. It has the same positive operation—the same surety of die movement that has put die casting production on a modern machine tool basis. One man, one lever, controls all operations—the machine automatically handling all operations of casting, pulling of cores, ejection and, in the case of soft metals, trimming in the dies.

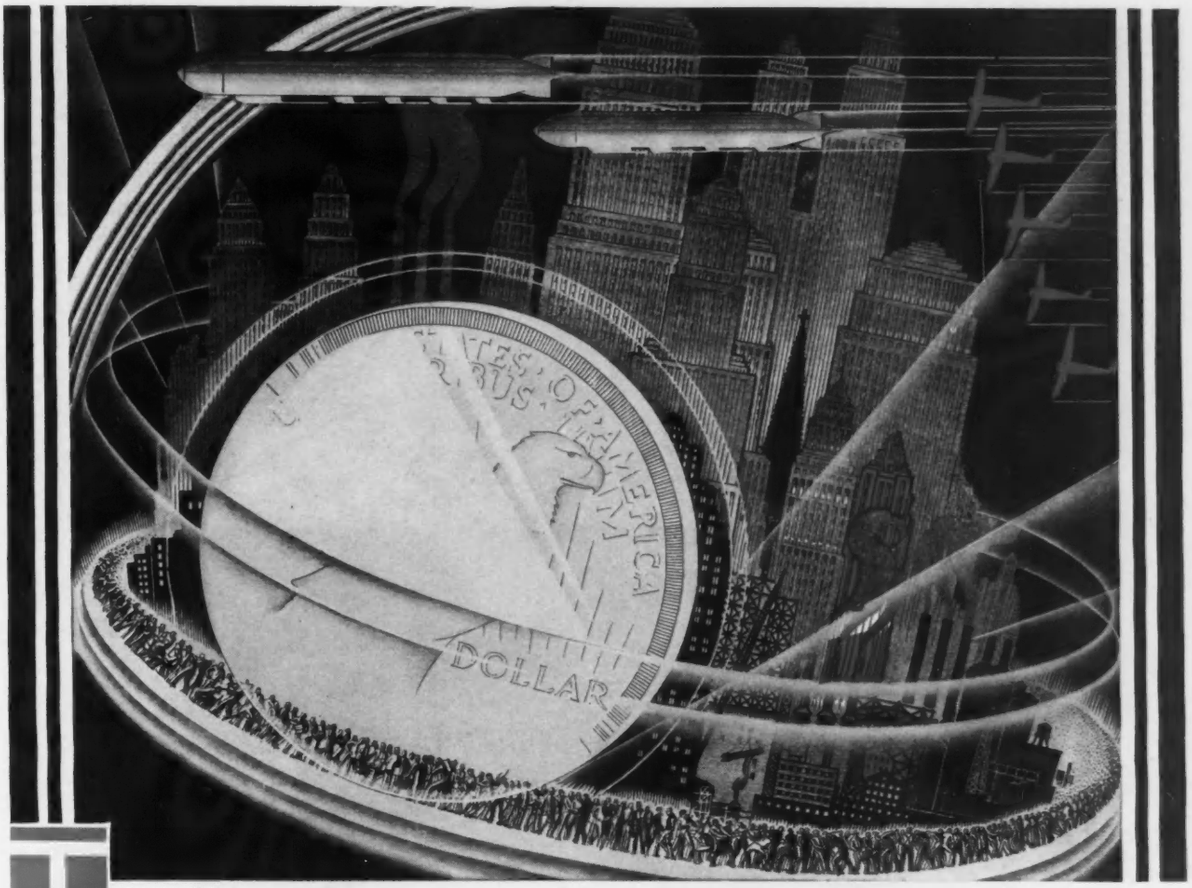
Just as Madison-Kipp first lifted the veil of mystery that in former years surrounded the production of die castings, so now this larger machine makes their production and use more widely available. Today die casting is an art which can be employed profitably under the standard rules of any successful mechanical business.

Full information regarding this machine, as well as the complete Madison-Kipp service for the design and manufacture of dies, will be sent to any operating official, executive or plant engineer interested.

MADISON-KIPP CORPORATION
DIE CASTING DIVISION
211 WAUBESA STREET, MADISON, WISCONSIN

Manufacturers of Air Grinders, Fresh Oil Systems, Mechanical Lubricators, Die Casting Machines, Die Casting Dies

Madison-Kipp
DIE CASTING MACHINES



THE DOLLAR TRAVELS A CIRCULAR ORBIT . . .

THE dollar too has a circular orbit which begins with the purchaser, passes through the seller who in turn becomes a purchaser and by his payment gives another seller the chance to buy. In due course the original purchaser is again reached as the dollar starts another cycle.

The business barometer registers the velocity of this travel—the greater the velocity the better is business. But dollar velocity has been artificially retarded. It can be accelerated by a determined effort and we manufacturers are in a strategical position to accomplish just that by buying

What more logical than to start the movement by the purchase of equipment which is needed to effect greater production economies immediately and at the same time provide the increased capacity and higher product quality which tomorrow is sure to demand?

The industrial oven is an excellent example of that type of equipment and right now is the ideal time for its consideration. Go into the question analytically—Get all the facts, then compute the savings.

Prepare for tomorrow and hasten its arrival

DISTRICT SALES OFFICES:
50 Church Street . . . New York
1323 Guarantee Title Bldg. . . . . Cleveland
273 Seventh St. . . San Francisco
908 Ellicott Square . . . . Buffalo
20 East Jackson Blvd. . Chicago
807 San Fernando Bldg. . . . . Los Angeles
248 Central Bldg. . . . . Seattle
10 High Street . . . . . Boston
West Building . . . . . Houston
Brown-Marx Bldg. . Birmingham
Walker Metal Products, Ltd. . . . . Walkerville, Ont.

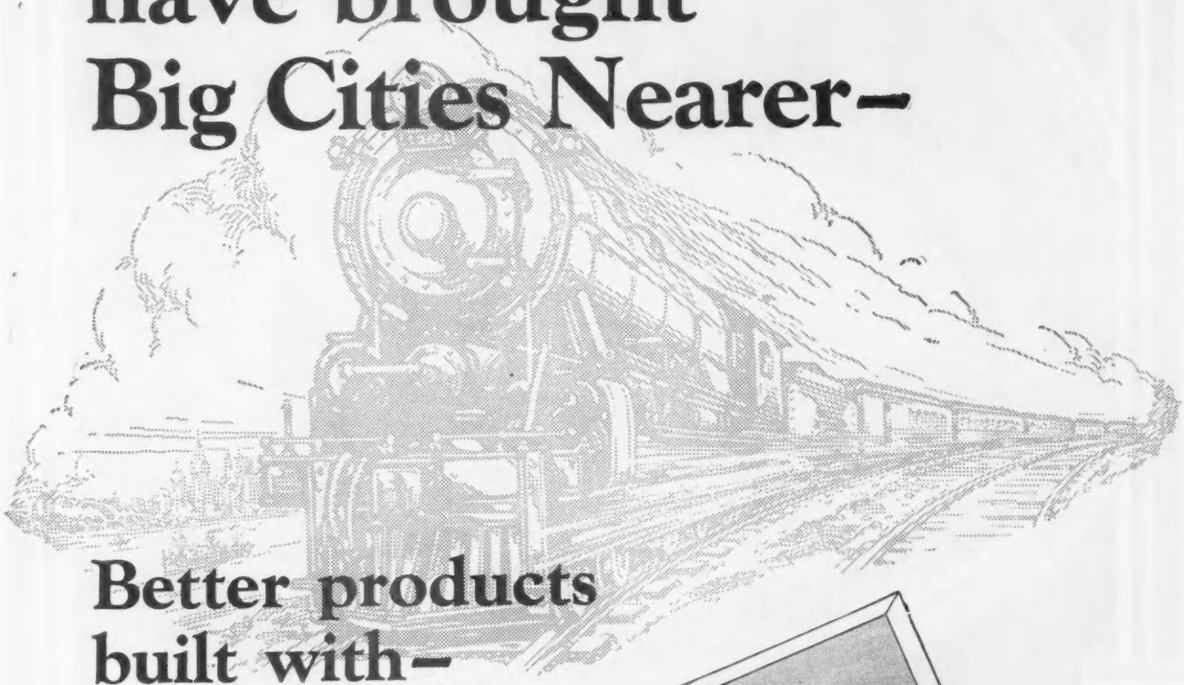
YOUNG BROTHERS CO.
6523 MACK AVENUE
DETROIT, MICHIGAN

YOUNG BROS. CO. OVENS — OUR BOLTLESS JOINT — DETROIT

OVENS FOR Core and Mold baking . . . Low temperature heat treating . . . Drying . . . Japanning and enameling . . . Electrical appliance baking . . . Metal Lithography. Adapted to all methods of heating.

INDUSTRIAL OVENS

Great Trains have brought Big Cities Nearer–



Better products built with–

NEWTON NEW-HAVEN

Die Castings

are cutting down those great spaces between initial inquiries and the satisfaction that leads to faster sales.

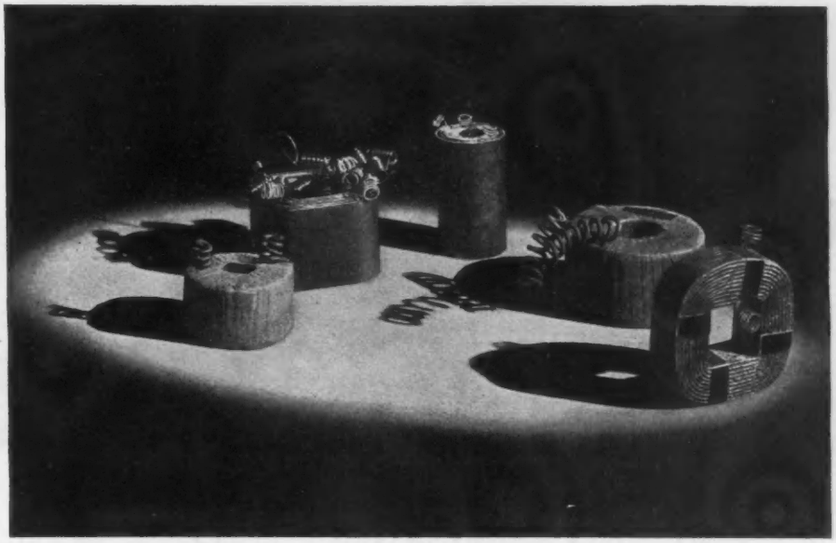
ATTRACTIVE PRODUCTS *economically produced are half the selling battle.*

THE NEWTON DIE CASTING CORPN.
146 Munson Street New Haven, Conn.

NDC-26

RESEARCH

challenges existing coil design



Franklin's research — the researches of Faraday, Edison, Steinmetz, Hertz and many others — gave us, step by step, the great science on which all electrical industry is founded.

Many fundamentals are known and classified. Many great basic researches are done. Their contributions have been applied.

Still, electrical research goes on! General Cable has accepted the never-ending challenge for improvement. In its specialized research on coils — and in other fields — it has already brought forth much new knowledge.

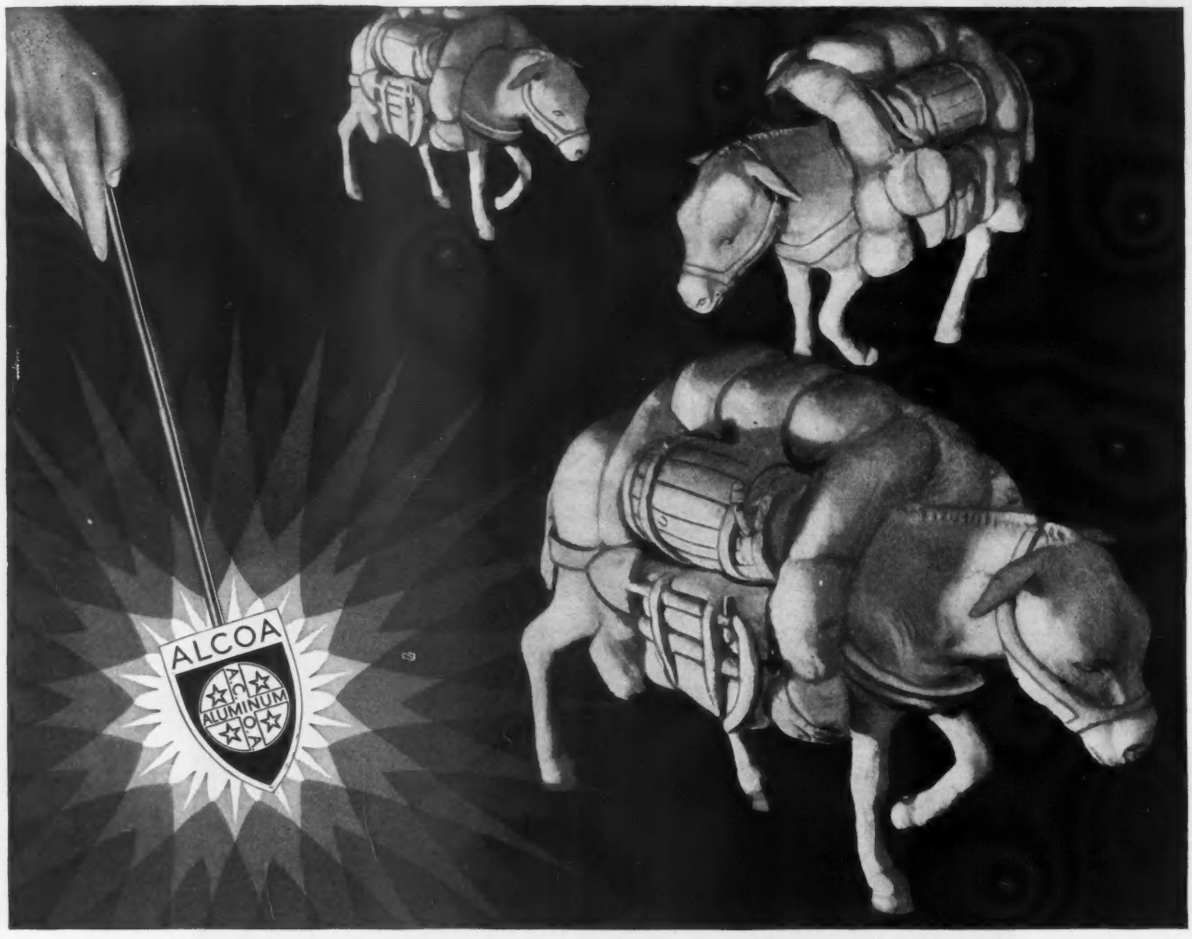
This new knowledge has had its practical tests. And General Cable is ready to apply it to assist you in redesigning the coils you use.

General Cable's experience and knowledge, its research and engineering staffs, its wide manufacturing facilities are all at your command.

GENERAL CABLE CORPORATION

EXECUTIVE OFFICES: 420 LEXINGTON AVENUE, NEW YORK • OFFICES IN PRINCIPAL CITIES

LIGHT TO WOMAN'S TOUCH . . . STRONG TO SERVE

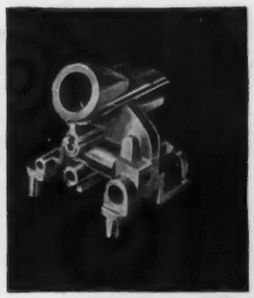


Dead-weight is a Burro's burden

. . . women look to you to lighten their work

Heavy metals give many a woman an extra "daily dozen" to do—she is more interested in pounds she daily doesn't lift—which means Alcoa Aluminum. Speaking of vacuum cleaners point to Alcoa Aluminum. Women recognize its lightness. Mention waffle moulds and that brings to mind the Aluminum grid which needs no grease and conducts heat five times faster than iron or steel. Not forgetting percolators and other table appliances which are cleanly and safe in contact with food products when made of ALCOA ALUMINUM

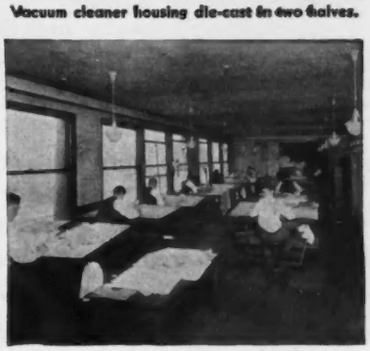
These are sales points well worth mentioning because women want appliances both electrically right and structurally light. ALUMINUM COMPANY of AMERICA; 2444 Oliver Building, PITTSBURGH, PA.



What lies behind A REPUTATION

A corner of the production department in the Stewart plant.

Vacuum cleaner housing die-cast in two halves.



Stewart draftsmen applying new products to the die-casting process.

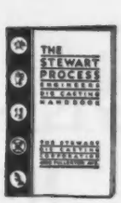
For Expert Die Casting

A record or service—years of experience—modern methods —an organization of experts.

. . . That is the reason why "STEWART" stands for fine die-castings in America today.

Die-casting, as a process, has developed with amazing rapidity during the past twenty years. And Stewart has kept modern. As a result Stewart has introduced new economy as well as simplified production to a long list of successful manufacturers. Each casting that leaves the Stewart plant is smoothly finished, strong, accurate and represents real savings in reduced machining, polishing and assembling costs.

Call in a Stewart engineer for practical information and advice about the die-casting process and its relation to your product. A card will bring our new Engineer's Die-Casting Handbook. Or why not send blue prints or samples for quotations today.



Our new "Engineer's Die Casting Handbook" is now ready. It contains a brief, factual description of the die casting process in all its modern developments. Write for your copy today.

Stewart

THE STEWART DIE-CASTING CORP.

4500 Fullerton Avenue, Chicago, Ill.

DETROIT NEWARK PITTSBURGH DAYTON CLEVELAND ST. LOUIS

G-E INSULATING VARNISH

Eliminates a Lot of Guesswork from Motor Repairs

You can't tell, by a glance, whether insulating varnish will *lengthen* the life of your motor coils—as it should. But you *can* tell by its maker.

General Electric makes insulating varnishes . . . uses them exclusively in its own products . . . stakes its reputation on them. You can use them confidently . . . always. They cut maintenance costs.

Skilled varnish makers and highest grade ingredients *make them right* —a great research laboratory keeps them *right.*

You can get G-E Insulating Varnishes from General Electric Merchandise Distributors everywhere. For full information, write Section M-3211 Merchandise Department, General Electric Co., Bridgeport, Conn.

INSULATING MATERIALS FOR EVERY PURPOSE

Varnishes, Oils, Shellacs, Paints

Filling and Sealing Compounds

Varnished Cloths and Tapes

Insulating Papers

Core Solder and Fluxes

Cords and Twines

MERCHANDISE DEPARTMENT · GENERAL ELECTRIC COMPANY · BRIDGEPORT, CONN.

GENERAL ELECTRIC
INSULATING VARNISH

"That fool, he says I'll need a gas buggy in my business!"

ADOLPHUS BACKWASH sneered at the first automobile and hired another drayman, who could snap a fly from between Bessy's ears with the extreme tip of a blacksnake whip.

"Motor trucks?" Why, they break down every two blocks! No Backwash will ever get crazy enough to buy one of those!!

But Backwash *did* buy motor trucks—after his competitors started to pay extra dividends on the basis of truck deliveries.

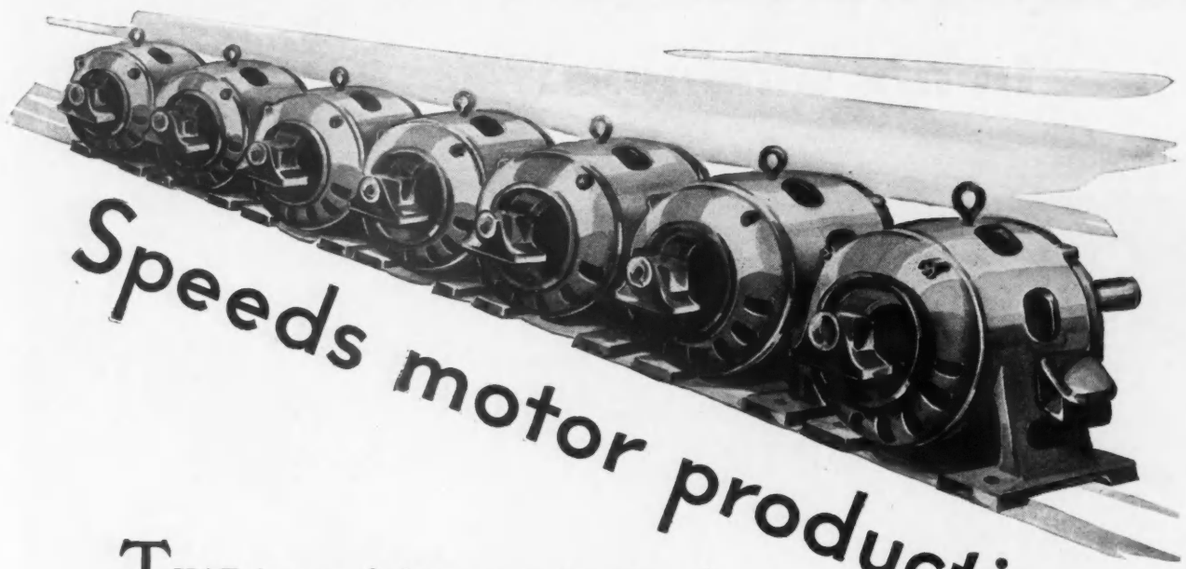
Today, other Backwashes sneer at new FINISHES. "Lacquer?" laughs the in-a-rut manufacturer. "Lacquer? You're crazy." But events have proved us *not* crazy. Good lacquer has revitalized whole industries. We have worked out new finishes, cheaper, more beautiful, more lasting than ever before—for thousands of *progressive* manufacturers. And they're doing more business because of it.

Now is a time when, at little or no cost, you can get squared away to meet and beat competition with a *good* lacquer finish. An Egyptian Lacquer man who knows how to solve *your* problems is as close to you as your telephone. Call him up!

THE EGYPTIAN LACQUER MFG. CO.
90 WEST STREET - NEW YORK CITY
Branches in charge of practical men *maintained in:*
ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI
CLEVELAND DALLAS DETROIT KANSAS CITY LOS ANGELES
PHILADELPHIA PORTLAND, ORE. SAN FRANCISCO SEATTLE SPOKANE ST. LOUIS

***The Maker Who is PROUD of What He Makes,* USES EGYPTIAN LACQUER**

Higher Baking Temperature



Speeds motor production

THAT is one of the reasons so many of America's motor builders are insulating the commutators with Super-Micanite. This unusual electrical insulation permits of baking temperatures above that which ordinary built-up Mica will withstand. Quicker production is the result.

That's not all. A better commutator is also produced. Super-Micanite has greater electric strength and less surface leakage. It is denser, hence assures more accurate spacing of commutator bars and greater ease in assembly. Even at high temperatures no corrosive decomposition products are formed.

These outstanding advantages have made Super-Micanite the choice of leading motor and generator builders. Many of its varied uses are described in Catalog 87. Write for a copy.

MICA INSULATOR COMPANY

New York: 200 Varick St. Chicago: 542 So. Dearborn St.
Cleveland Pittsburgh Cincinnati Birmingham Seattle
San Francisco Los Angeles Toronto Montreal
Works: Schenectady, N. Y. London, England

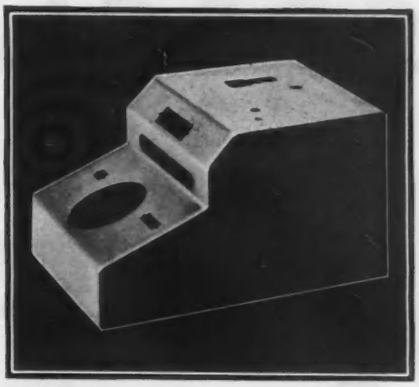
PERFECT MICANITE INSULATOR
REG. U.S. PAT. OFF.

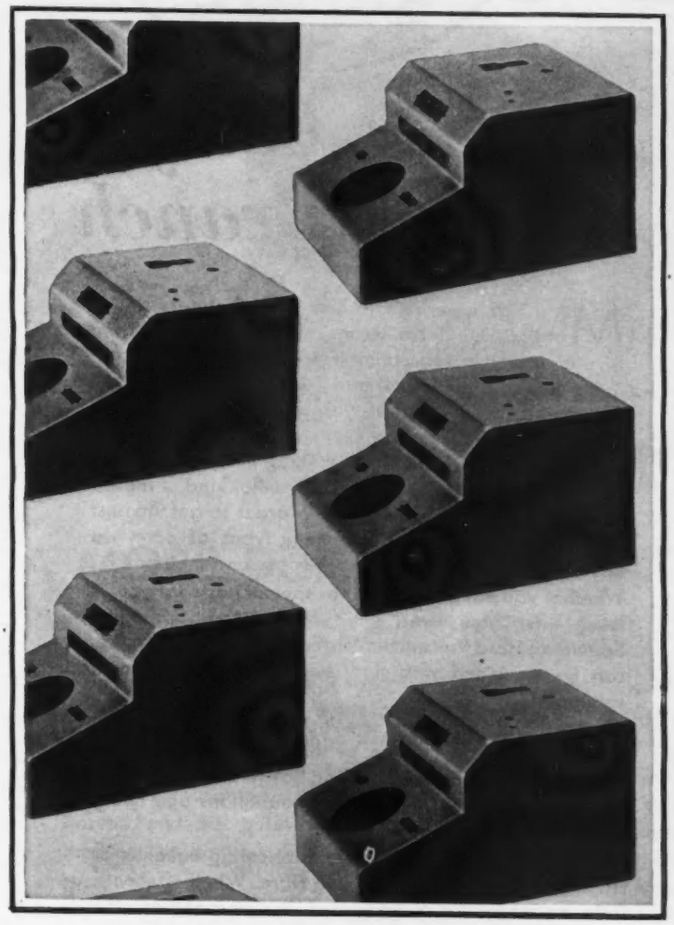
Electrical INSULATION

PERFECT EMPIRE INSULATOR
REG. U.S. PAT. OFF

MICA INSULATION OILED CLOTH INSULATION

Securing Better Results in Designing Pressed Metal Parts . . . . .





This time clock case, produced in one-piece by G. P. & F., was considered an impossibility by some companies.

Wide Experience Necessary To Utilize Full Possibilities . .

INQUIRY among successful users of pressed metal parts will reveal this fact: Better results in design are secured when stamping specialists are consulted in working out the details, and that the measure of benefit from such assistance depends largely on the experience of the stamping concern.

G. P. & F. engineers have a background of fifty years experience in pressed metal design. They are intimately familiar with the ingenious production methods and short cuts employed in the 19-acre G. P. & F. plant. Whatever they recommend as feasible and practicable in design they know can be accomplished with properly made tools in the hands of skilled workmen, and by close watching of tolerances which is so important.

Many times, manufacturers who have given up hope of further improving their product to meet changing buying habits, and lowering production costs to meet new price levels, have consulted G. P. & F. engineers and found that it could be done. An example is the one-piece time clock case shown on this page, which at first was considered impossible to manufacture.

Let G. P. & F. engineers know your problem. There is no obligation.

GEUDER, PAESCHKE & FREY CO.

Sales Representatives in Principal Cities in All Parts of the Country

1392 St. Paul Avenue, Milwaukee, Wis.
370 W. Ohio Street, Chicago, Ill.

G.P.&F. STAMPINGS

GEUDER, PAESCHKE & FREY CO.

1392 St. Paul Ave., Milwaukee, Wis.
370 W. Ohio St., Chicago, Ill.

Please send your 1930 Booklet, "In Harmony with Modern Progress," to the address below. It is understood the writer is not obligated.

Name _____

Company Name _____

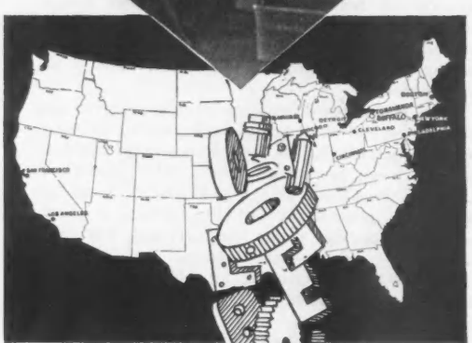
Address _____

(A-1113)

SPECIAL SHAPES

Spaulding

FIBRE
(GENUINE HARD VULCANIZED)
SPAULDITE
(LAMINATED SPAULDING-BAKELITE)
ARMITE
(THE IDEAL THIN INSULATION)



Made at Every Spaulding Branch

MANY of America's largest manufacturers find it cheaper to have us make special shapes from Spauldite (Laminated Spaulding-Bakelite), Hard Vulcanized Fibre or Spaulding Armite (Fish Paper) than to make these parts themselves. Every Spaulding branch is completely equipped with the most modern machinery for the economical production of shapes and parts. We know what grade of stock to use—what kind of dies to make and how to handle them, in order to get the best results at the lowest cost. For many types of parts we have worked out labor saving devices and methods.

Whether you have us make your special parts for you or make them yourselves, you will find that Spauldite, Spaulding Hard Vulcanized Fibre and Spaulding Armite, can be machined with surprising ease and minimum spoilage.

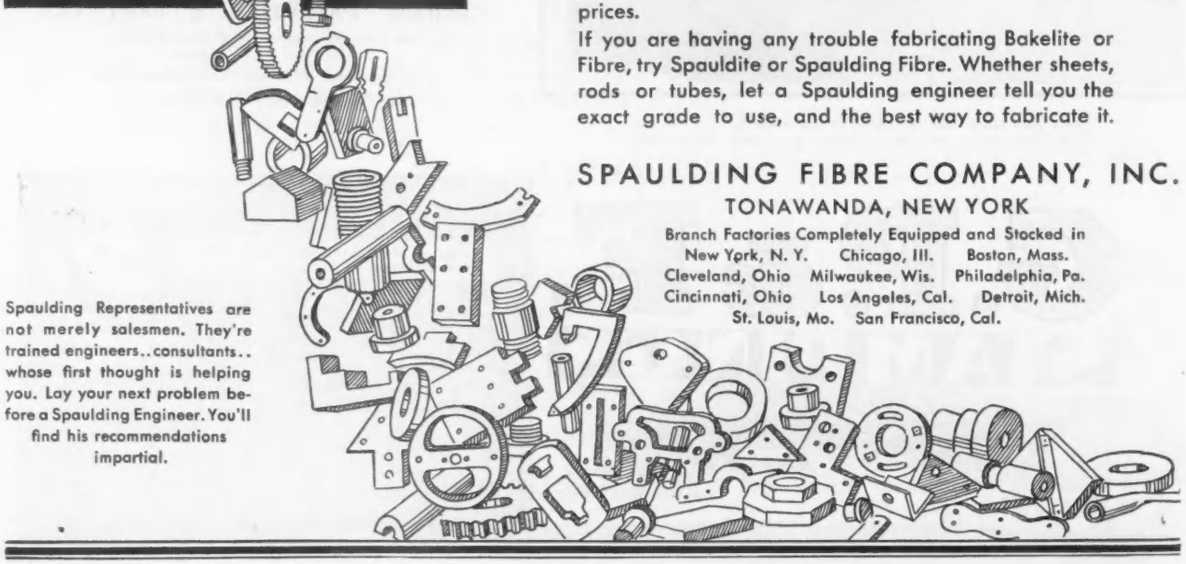
Send us blueprints and specifications for any special parts that you are making, or that you think might be made, from hard fibre, Laminated Bakelite or Armite, and we will be glad to make recommendations and quote prices.

If you are having any trouble fabricating Bakelite or Fibre, try Spauldite or Spaulding Fibre. Whether sheets, rods or tubes, let a Spaulding engineer tell you the exact grade to use, and the best way to fabricate it.

SPAULDING FIBRE COMPANY, INC.
TONAWANDA, NEW YORK

Branch Factories Completely Equipped and Stocked in
New York, N. Y. Chicago, Ill. Boston, Mass.
Cleveland, Ohio Milwaukee, Wis. Philadelphia, Pa.
Cincinnati, Ohio Los Angeles, Cal. Detroit, Mich.
St. Louis, Mo. San Francisco, Cal.

Spaulding Representatives are not merely salesmen. They're trained engineers..consultants.. whose first thought is helping you. Lay your next problem before a Spaulding Engineer. You'll find his recommendations impartial.



Bakelite Molded Midgy Night Lamp, made and patented by Midgy-lamp Co., Phila., Pa.

A MORE DURABLE AND ATTRACTIVE LAMP BASE

AT ONE-THIRD LESS COST

Wood was the first material used for the Midgy lamp base, but wood proved troublesome because it would dry and split. It also required the additional operation of lacquering. To overcome these difficulties, Bakelite Molded was adopted, as it does not dry and split when heated, and has a lustrous finish that needs neither lacquer nor varnish.

The lamp base is formed of two Bakelite Molded parts, the stand and the collar or socket chamber. Four of each of these parts are completely formed in one closing of the molding press. Three operations required when wood was employed are now eliminated, and the Bakelite Molded bases are produced at one-third less cost.

To provide variety, a number of different colors of Bakelite Molded are used, and also some two-color grain and mottled effects. The lamp in the photograph is dark blue and orange. This lamp is but one of the many hundreds of ways in which Bakelite Molded has been used to improve electrical devices and appliances.

Bakelite Engineering Service—We manufacture a wide variety of Bakelite resinoid molding materials, varnishes, lacquers, enamels, cements, and other products. Twenty years experience in the development of these materials for mechanical and other uses, provides a valuable background for the cooperation offered by our engineers and laboratories. Write for Booklet 52M, "Bakelite Molded".

BAKELITE CORPORATION, 247 Park Avenue, New York CHICAGO OFFICE, 635 West Twenty-second Street

BAKELITE CORPORATION OF CANADA, LIMITED, 163 Dufferin Street, Toronto, Ontario

BAKELITE

REGISTERED U. S. PAT. OFF.

"The registered Trade Mark and Symbol shown may be used only on products made from materials manufactured by Bakelite Corporation. Under the copyright "B" is the numerical sign for infinity, or unlimited quantity. It symbolizes the infinite number of present and future uses of Bakelite Corporation's products."

THE MATERIAL OF A THOUSAND USES

Industrial Leaders Who Use Synthane--American Gas Accumulator

SYNTHANE
Laminated Bakelite

USED BY AMERICAN GAS ACCUMULATOR CO.★

The use of Synthane Laminated Bakelite in all the electrical traffic control systems made by the American Gas Accumulator Company offers a good example of the unfailing performance of Synthane under the most rigorous weather conditions.

This company uses Synthane structural insulation in all master and local controls, because it better withstands varying degrees of temperature and humidity, because it is more moisture resistant and because it is a better insulator.

Synthane Laminated Bakelite is a better and more uniform structural insulation. Its dielectric strength is higher, surface leakage less and moisture absorption lower. It is stronger, does not warp and machines more easily. We supply Synthane in sheets, rods, tubes and fabricated parts.

Samples for your own testing will be supplied to your specifications. You, like the American Gas Accumulator Co., will be more then satisfied with results. Standard grades can be shipped immediately in any quantity.

★AMERICAN GAS ACCUMULATOR CO.

uses Synthane in all automatic, electrical traffic controls, because it withstands the most severe weather conditions and makes possible the manufacture of a small, compact box, physically strong with excellent insulating qualities, low moisture absorption, and no warpage. In the shop they find it machines more easily and drills and saws without chipping or fracture.

With Synthane they fulfill the requirements of the National Electrical Code.

SYNTHANE
CORPORATION OAKS · PENNA

NEW YORK CHICAGO CLEVELAND ST. LOUIS
LOS ANGELES SAN FRANCISCO

Sheets, Rods, Tubes, Fabricated Parts

Globar
REG. U.S. PAT. OFF.
BRAND

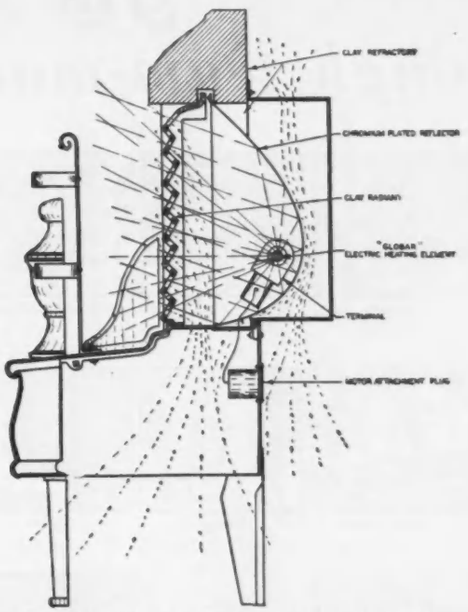
CONVERTED

for the New Method Stove Company, Mansfield, Ohio.

Originally a radiant gas fireplace heater, converted to a combination radiant and convection electric heater of unusual efficiency through the addition of Globar Brand Electric Heating Elements.

NOTE THE SIMPLICITY OF CONSTRUCTION

Globar Corporation Engineers will be glad to assist you in solving similar problems.



Cross Section illustrates how the cold air is drawn off the floor and passes in front of element and back of reflector. Straight lines indicate direct radiant energy.

GLOBAR CORPORATION

REG. U. S. PAT. OFF.

A SUBSIDIARY OF THE CARBORUNDUM COMPANY

NIAGARA FALLS, N. Y.

PACIFIC ABRASIVE SUPPLY CO., SAN FRANCISCO AND LOS ANGELES

WILLIAMS & WILSON, LTD., MONTREAL—TORONTO, CANADA STEINMETZ & COMPANY, PHILADELPHIA

(Globar is the registered trade name given to non-metallic electrical heating and resistance materials, and to other products of Globar Corporation, and is its exclusive property)

GE-Flex

tough team-mate for YOUR product

Lighting

Household Appliances

Construction Machinery

Electric Drills

Garages

Offices

Washing Machines

Vacuum Cleaners

TOUGH, rugged, fit for hard service every day of the year anywhere—that's GE-Flex All-Rubber Cord! It helps electrically-driven products stand the gaff.

Indoors or out ... in coal-pocket or ship yard ... in factory, garage or machine shop ... in the office or in the home—wherever any portable electrical appliance or machine needs a power line, *there's* a place for GE-Flex All-Rubber Cord.

Its multi-strand, tinned copper conductor makes it flexible. Its heavy, rubber jacket vulcanized by a special G-E process enables it to resist abuse and prevent troublesome kinks and cracks. It withstands weather, acid, abrasion.

Above all, it puts the extra element of *General Electric dependability* into every machine or device it serves.

Make GE-Flex All-Rubber Cord original equipment for *your* product. It pays you in performance... in customer satisfaction ... in repeat business.

If you are not sure how GE-Flex Cord will meet your own specific needs, write TODAY for data.

Section W-3211, Merchandise Department,
General Electric Company,
Bridgeport, Connecticut.

Send me full information about GE-Flex All-Rubber Cord.

Name.....

Address.....

.....

GENERAL ELECTRIC

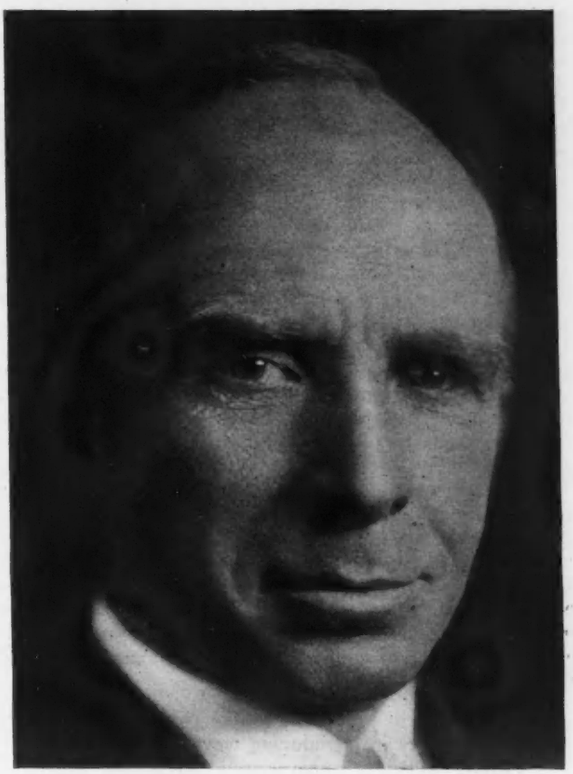
MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONN.

NOV 1S 1930

Electrical Manufacturing

Production - Marketing - Administration - Repairing

Volume 6 NOVEMBER-1930 Number 5



Recognizing a definite individual responsibility to the industry in which I am engaged, I pledge myself:

1. To make my published price schedules simple and definite, capable of easy interpretation and administration, and to refrain from all secret rebates or other secret concessions affecting prices or terms and conditions of sale not clearly indicated in my published schedules.
2. In respect to all products which are generally competitive, to keep my price schedules in proper economic balance with the current market situation.
3. In respect to "specials" to base my prices on accurately determined costs plus a fair margin of profit.
4. To distribute my published price schedules generally to my competitors and to the trade.
5. To maintain a firm price policy and only effect price changes by a general change in my published schedules.
6. To promptly give to any other executive such facts in relation to my prices and price schedules as will assist in correcting any misinformation which might otherwise exist as to the competition which I am giving the rest of the industry.

Self-Restraint in Business*

CLARENCE L. COLLENS

President, Reliance Electric and Engineering Company
President, National Electrical Manufacturers' Association

OUR American institutions are founded upon and can only survive under a proper balance between individual liberty and the free play of individual intelligence and initiative on the one hand, and on the other such restraints as are necessary to safeguard the rights of others or the welfare of society as a whole. These restraints may either take the form of laws enforced by the police powers of the Government or may be self-imposed.

As society becomes more intelligent and more civilized, it functions more and more through the exercise of self-restraint on the part of each individual than through the police powers of the Government. Each individual recognizes a definite responsibility to society entirely aside from those imposed by law and in fact, laws become dead letters unless endorsed by the cooperation and self-restraint of the majority. In the ideal social order laws are unnecessary.

A parallel may be drawn in the business world which can only function properly—and by properly I mean render a necessary service with full recognition of the rights and economic interests of all parties involved—by a similar balance between freedom of individual action and proper restraint. Here also the restraint must be both legal and self-imposed, for laws alone cannot make business function properly any more than laws alone can make society civilized.

The flagrant disregard of some of the principles upon which our American institutions are founded, has gradually developed into legislation which places definite legal restraint on business, all tending to prevent monopoly, to promote and preserve the competitive system and under the competitive system to make business fair both to all competitors and to all consumers. Even under these legal

* Address delivered at the Annual Meeting of National Electrical Manufacturers Association, Old Point Comfort, Virginia, Oct. 20, 1930.

restraints, competition may be either ruthless and ruinous or intelligent and economic, for our laws are merely concerned with one side of the economics of business, namely, protecting the purchasing public from artificial enhancement of prices, but in no way protecting any industry from the ruinous prices of one or more competitors.

Ruthless, ruinous competition represents the perversion of individual liberty and does not bring to the inherent right of the individual to do business, or to individual initiative and intelligence, the reward to which business is properly entitled and which it has never been the intention of the law to destroy. Competition cannot become fair and economic unless to the legal restraints which are recognized as necessary is added the idea of *self-restraint*. Just as in the ideal social order, so also in the ideal business world, competition requires no laws and functions properly with due regard to the interests and rights of all parties concerned, because it is intelligent, self-governed and self-restrained. Voluntary self-restraint in respect to one's actions, for the reason that the course decided upon appeals to the judgment and intelligence, is always more acceptable than to have some outside power make a given course of action compulsory.

¶ "There must be a sincere desire on the part of each executive in industries where unhealthy competitive conditions exist to exercise intelligent self-restraint in the conduct of his own business."

In many industries where competitive conditions are unhealthy, it is not a change in law that is required to cure the disease, but rather a change of heart and the development of mutual respect and confidence. There must also be a sincere desire on the part of each executive to recognize a definite responsibility to the industry in which he is engaged, to be better informed regarding the motives and policies of his competitors, and the facts of the market situation, to use his liberty of action wisely and to exercise intelligent self-restraint in the conduct of his own business. Without such a change of heart on the part of many business executives, unhealthy and destructive competitive conditions cannot be improved.

Recognizing all legal limitations and acknowledging these as necessary and desirable, what liberties do I have under the competitive system and what self-restraint am I willing to impose on myself in doing my share toward promoting intelligent economic competition in the industry in which I am engaged?

First and foremost in a competitive system, it is my right to determine my own price policies and price schedules. By price schedules I mean lists, discount schemes, classification of customers, and terms and conditions of sale. Even though I have full freedom in this respect, it is also my right or within my control:

1. To distribute my established price schedules freely to both my competitors and my customers.
2. To make my price schedules simple and definite, easily understood by both my competitors and my customers.
3. To eliminate all secret rebates or any other form of price concession not clearly and definitely indicated on my published schedules.
4. To base my price schedules on accurately determined costs plus a fair margin of profit, or to follow the price policies and price schedules of a market leader if my own interests and those of the group are in my judgment best promoted by so doing.

The competitive system does not presuppose or require lack of accurate knowledge regarding current market conditions or the price schedules of one's competitors. Basing individual price policies on trade rumors, statements made by buyers, and indirect information which in many cases is misinformation, is not required by law and is one of the principal causes in developing an uneconomic competitive situation. I prefer that my competitors know directly from me where I stand and am willing to place that information in their hands.

The above relates to such products as I regularly list. There are always "specials" whose price cannot be determined by published information. If it is my right to distribute published current market information, I feel it is also within my right to advise any other competitor of the facts regarding any current transaction involving specials and, if he is willing to give me that information, to receive from him the facts regarding his quotation on the same transaction. In respect to standard competitive products, it is usually some market leader who sets the pace. But any competitor may be the first in the field with a "special" and it is, therefore, even more important that in respect to specials, I observe the policy of basing price on accurately determined costs plus a fair margin of profit.

A liberty which many desire to have is that of "price-cutting" but no competitive industry can be healthy and economically sound where price-cutting is prevalent. Price-cutting, that is, deviation from one's established prices, is unfair both to one's competitors and to other purchasers who under similar conditions have not enjoyed a price cut. Disguised under the legal permissive qualification of "necessary to meet competition," it is in many cases deliberate or is based on misrepresentation or inaccurate information of the competitive situation, and, as such, is illegal price discrimination. Its ultimate effect is "to substantially lessen competition" by means of the elimination of the weak. This is the phase of competitive relations where self-restraint counts most and in the interests of both the purchasing public and my competitors I am willing to pledge myself to maintain a firm price policy, and whenever I feel that price changes by me are "necessary to meet competition," I will effect the change not by a price cut on an individual negotiation but by a general adjustment in my price schedules to be enjoyed by all my customers and with the usual publicity to the trade.

¶ "It is rivalry in introducing ways and means of gaining individual competitive advantage that reduces many industries to unhealthy conditions."

It is also my right to introduce any commercial practice in the conduct of my business which in my opinion will give me a competitive advantage. Here again intelligence and self-restraint are absolutely necessary. Each executive must bear in mind that any price or any practice introduced by him to gain individual competitive advantage, if it proves effective, will be followed by his competitors, or his competitors may even go him one better, the individual advantage being then lost. It is rivalry in introducing ways and means of gaining individual competitive advantage that reduces many industries to unhealthy conditions. I will not introduce any price or commercial practice to gain individual commercial advantage which if followed by my competitors generally would be uneconomic or commercially unsound. Examples of such practices are extension of terms of payment beyond those generally recognized, too liberal guarantees, consigned stocks out of all relation to the possibilities of business, excessive entertainment of customers, secret rebates or other concessions not shown in published price schedules, price differentials not justified by one's competitive position in the industry, etc.

I also feel at liberty to frankly tell any of my competitors what in my judgment are the harmful effects of any of

his policies or in what respect his competitive practices are uneconomic or commercially unsound. I legally cannot attempt to influence his decision other than by appealing to his own judgment and intelligence and if of his own free will and purely as the result of a better knowledge of the entire situation, he changes any of his practices, it cannot be claimed that I have conspired with him in restraint of trade.

And now to a liberty which some might deny. I feel it is my right to meet with my competitors as a group and discuss freely and frankly the economics of our industry and competitive practices which are unfair, destructive or unsound from a broad business standpoint. Such meetings do not imply illegal understandings or agreements. I will not be a party to such understandings and reserve for myself absolute freedom of individual action and the right to make and change my individual decisions at any time. Are such meetings necessarily in restraint of trade? We are told that it all depends on the result or effect of the meeting.

To be in restraint of trade, irrespective of the results or effects, I feel it must be definitely proved that there was restraint to any executive's freedom of individual action in the control of his business, that the decisions of some individual executives were influenced by threats or the fear of reprisals, that there existed a moral obligation to follow some recommendation made, or that such meetings were used as a cloak to exercise arbitrary, monopolistic powers in respect to prices. If such meetings permit me to conduct my business more intelligently, with a more accurate knowledge of the competitive situation, and with greater fairness both to my competitors, my stockholders and my customers, or to make decisions in respect to my individual policies which assist in eliminating unsound commercial practices, I am not infringing any of the basic principles of a competitive system or of the laws which have been set up to protect that system.

To summarize, I make the following statement and pledge to my competitors:

I indorse the competitive system and reserve for myself entire freedom of individual action and the right to make and change at any time my decisions in respect to prices and competitive practices. Recognizing, however, a definite individual responsibility to the industry in which I am engaged, I pledge myself to the six declarations enumerated at the beginning of this article, and in addition I pledge myself: 7. To base my decisions in respect to competitive practices on established facts and to give no credit to rumors, or to incomplete or indirect information regarding the practices of my competitors, and (8) to refrain from introducing any practices to gain individual competitive advantage which if followed by my competitors generally would be uneconomic or commercially unsound.

"An executive in control of an individual business in a highly competitive group is entitled to all the facts necessary for the intelligent conduct of his individual business."

These declarations form the platform on which I stand in the conduct of my own business, as far as any action by me affects the interests of the industry in which I am engaged. If each executive in a competitive group will be as frank in advising the public and his competitors as to just what his policies are, competition will be none the less keen, but it will be saner, more intelligent and more economic. It merely eliminates guesswork, rumor and misinformation as a determining factor in price and price policy decisions. Reserving entire freedom of individual action, an executive in control of an individual business in a highly competitive group, is certainly entitled to such facts as are necessary, and, in fact, to all the facts that are necessary, for the intelligent conduct of his individual business.

Such a program does not negative the law of supply and demand and adjustments in price levels will still follow the competitive demands of that law and any basic changes in cost, but under any conditions of supply and demand or of cost, prices will be more stable. It is the American plan of price stabilization based on freedom of individual action, influenced only by publicity, accurate facts, intelligence and self-restraint. Such a program will make our competitive system work smoothly and efficiently.

Brand New Fathers' Problems Solved

Brand new fathers who see no reason why the infant Junior should rob the head of the house of his customary full night's sleep should take a leaf from the book of E. S. Darlington, an engineer in the vacuum tube engineering department of the General Electric Company.

Among other jobs, Mr. Darlington has built and now operates the room of wonders in the laboratory there. The place is entered by rapping—the proper sequence of signals on a metal plate; a phonograph bids you welcome as you cross the threshold; a simple device records your passage through the room; and a dozen interesting things, all operating with photo-electric cells or thyratrons or both, entertain you.

When the Darlington infant arrived, Darlington pere decided to put some of his mechanical ingenuity at work to bear some of the burdens of the householder. The baby, according to the best modern precepts, sleeps in a different room than the parents. Because of this isolation from the first-born there were hours of worry and sleeplessness. The baby might be crying, falling out of the crib, or enduring the pains to which infants are subject.

The answer was very simple. A telephone transmitter, used as a microphone, was rigged up by the crib-side and connected by wire to an amplifier and a loud speaker close to the ear of the father. At the first cry of the baby, father is awake and alert. A phonograph at his side is turned on and a lullaby sounds through a loud speaker near the crib. If the lullaby fails to soothe, the father knows that some other form of attention is required.

Looking Through Ten Inches of Steel Plate with an X-Ray

A discovery heralded as of wide importance in the steel industry by which X-ray photographs can be taken through solid steel ten inches in thickness was revealed recently at the twelfth annual National Metal Exposition.

The new method is the result of efforts by R. F. Mehle, G. E. Doan and C. S. Barrett of the Naval Research laboratory in Washington. Their findings were presented in a joint paper.

"One of the greatest problems of the steel industry is to locate cracks or defects inside of the metal," they said. "Heretofore we have been able to penetrate only four inches of plate by the X-ray.

"Our new method is to take radon, the gas which radium continually throws off, trap it in a tube, surround the tube with glass and then group the steel castings on the outside. The rays pass through ten inches of metal with sufficient strength to make usable photographs."

He Trained Electricity to do the Cooking

GEORGE A. HUGHES

Who would likely be a newspaper editor if he were not head of the Edison General Electric Appliance Company

A personality Sketch by Lyman Anson

". . . city editor of a small-town sheet in North Dakota . . ."

IF George A. Hughes were not head of the Edison General Electric Appliance Company he would be a newspaper editor. Not editor of some huge metropolitan sheet, either; but most likely editing a long string of small-town papers, with editorial stress laid on practical help for the boys of the community.

From such a statement, you might guess that Hughes has several sides to him. And that's a fact.

But you're going to be disappointed if you're looking for one of those cold, marble-faced, precise types such as popular imagination attaches to the head of so successful a manufacturing organization as the Edison General Electric Appliance Company. The truth of the matter is, Hughes isn't a type at all. He's very much of an *individual,* as you discover after the first thirty seconds of conversation.

A solid, powerfully built man of middle age, with a round, genial face that bespeaks a keen sense of humor, he looks at the world through eyes deep set with the understanding of human nature. And perhaps, after all, that is the thing at the bottom of most successful careers, no matter in what line.

Stoves, Newspapers, Indians

HOUSEWIVES long have connected the name of Hughes with electric stoves. However, years before electric heating reached its present practical state, the same name was well known out in the Dakotas as belonging to a man who had organized a public utility company which furnished power to ten local communities.

And previous even to that Hughes had left his imprint in the newspaper "game"; first as city editor of a small-town sheet in North Dakota; later as reporter for a St. Paul daily. At the same time he was winning some recognition as a correspondent whose news gathering proclivities furnished vivid copy to a large number of eastern publications.

Still further back, an infant named Hughes was hustled, along with the rest of the white inhabitants, into a crude Dakota territory "town hall" to escape an Indian raid which, fortunately, failed to materialize. Had the attack been carried out with the dire results all too common in those frontier times, the present status of household and commercial electric heating would be several laps behind what it is today. At any rate, its development would probably be associated with some name other than Hughes.

For that early experience with Indian perils stands out as a high spot in the memory of the same man who invented the first practical electric stove, and helped to found the Edison General Electric Appliance Company which he heads today.

Those earlier years formed a colorful background; a background bound to make a permanent impression on a young newspaper man. Indian troubles were still real topics of conversation out in the Dakotas where he lived. The scout, Buffalo Bill—the Custer Massacre—all these things were still being discussed by many in that district who could give first-hand information to a city editor with his ear cocked for the picturesque.

One of Hughes' close acquaintances was elderly Doctor Porter, formerly an assistant army surgeon, who had escaped death at Custer's side only because he had been refused permission to accompany that ill-fated little group which, branching out from the main division, had come to grief.

". . . An infant named Hughes was hustled along into a crude Dakota territory 'town hall' to escape an Indian raid . . ."

This atmosphere of hardy, pioneer adventure, reflected in his journalism, gave Hughes plenty of individuality as a newspaper man and, in turn, made the job a most congenial one.

"I'll always have a soft spot for newspaper work," he reflected. "That is, the editorial end. But, unfortunately in the old days, at least, that was the end which offered a mighty skimpy financial reward if you had much ambition about you. That was why I quit to go into what, by comparison, is commonly thought of as 'big business.'"

The opportunity came for young Hughes to acquire a power franchise. Then he organized a company and got his first taste of public utility work.

The opportunity came. That statement isn't exactly correct. Opportunities don't rise up and force themselves on a young newspaper man, as a rule. He has to have vision coupled with unusual organizing ability in order to see a potential opportunity, then whip it into a practical, going concern.

That's what Hughes did, after spending years in a newspaper office. And I suspect that that power company served to stimulate the inherent organizing ability which later was to make itself felt in a much larger way.

His power company did another thing for him. Serving ten communities, as it did, a time came when it was necessary to decide whether or not to equip its properties with gas plants in order to meet the growing demands for household cooking as well as lighting and power. The decision against gas works set Hughes to work on the problem of electric ranges around which so much of his recent work has

centered. He trained electricity to do the cooking.

In time the power company in which he had become so deeply interested was sold. And a while after that Hughes' good luck appeared to have deserted him. I don't know just what happened. I didn't ask. I only know that on May 1, 1908, George A. Hughes arrived in Chicago minus a job or anything else that your average accountant might put in a man's asset column. For an accountant is likely to sidestep such intangibles as organizing ability even when it is crystallized into so definite an idea as manufacturing a really practical electric stove.

And yet, in this case, these intangibles which Hughes brought to Chicago with him might well have ranked among the most substantial of assets. For, with them, he formed the beginnings of a company which today, scarcely twenty years later, is known throughout the world.

Hughes helped to found the Edison General Electric Appliance Company by arranging a consolidation between the Hot Point Company of California, the Heating Devices Section of the General Electric Company and the Hughes Electric Heating Co.

For years its business has consisted in the development and distribution of electric household and commercial heating equipment.

There have been difficulties. There always are. According to Hughes, electric heating devices would have reached their present popularity in half the time except for one condition in the electrical industry that sounds, on the surface, like a true paradox.

"The sale of electric ranges and other electric heating equipment," he explained, "has long been handicapped, not by the gas business, as one might expect, but by the easy sale of electric lighting itself. What I mean is this. It was no trick for a public utility company controlling both the gas and electricity of a community (as most of them do), to market its kilowatt product in the form of lighting. But this very fact made it much harder to keep pace in the sale of its gas. The inevitable result was that sales managers, being essentially human, have allowed the electric stove sales to shift for themselves while they pushed gas equipment.

"The decision against gas works set Hughes to work on the problem of electric ranges . . ."

"This has been less noticeable of course, in communities where gas and electricity have been manufactured and distributed by separate companies. Yet, on the whole, it was a condition that forced electric heating to stand on its own feet and grow in popularity in *spite* of the severest gas competition. That it has popularized itself through sheer merit speaks well for the future of the industry.

Commercial Cooking Goes Electrical

"THEN, too, in recent years another factor has entered in, adding mightily to the use of electricity for heating. I refer to the growing use of large, electrically heated units such as commercial ovens for bread baking. The layman hardly realizes the extent to which kilowatts are used in this way. It may give you some idea when you discover that in one city of 100,000 population consumption of electricity for commercial cooking alone equals the entire lighting consumption in an average city of 25,000.

"There's no doubt that a tremendous development in the use of electricity lies ahead in this direction."

But vital as Hughes' activity has been, and still is, in the technical problems involved in electrical heating devices, beneath it all is a sincere interest in the human element of his organization. First and foremost he likes to deal with human nature, an insight into which he acquired back in those days when he ran a small-town paper.

"Other things being anywhere near equal," he said, "I prefer employees who have been brought up in small communities. This is particularly true in our sales force. A good salesman has to understand folks. It has been my experience that the intimate life of a small town yields that necessary understanding far better than does the superficial, veneered acquaintanceships of a great city."

But men mean much to Hughes aside from their particular function in his organization. Personally, he is greatly interested in welfare work, though probably he wouldn't call it by that name.

He has definite ideas, for example, on the sale of company stock to employees. He doesn't like it. "It's all right to make it easy for your people to buy stock in your company," he observed, "but there's the other side of the picture that isn't always taken into consideration. What happens to an employee investor when the market value of his stock goes down, as it is quite likely to do at times in most organizations. No, we prefer to protect our people through a safer plan of Employee Savings Certificates which we have worked out.

"Maybe a high score in trap shooting serves to preserve lines of humor in his face . . ."

"This enables our employees to deposit their savings with us at 7 per cent when left intact for a year or over, or 5 per cent if withdrawn in less than a year. Of course, they are at liberty to remove their money at any time. But, besides the 7 per cent it brings him, the owner of such a Savings Certificate has the added inducement to let

his funds accumulate because of the fact that savings left with us for a year or over also earn a share of the company's annual profits.

And yet, unlike some business executives, Hughes' activities are by no means confined to the management of purely business affairs. He is much too curious about plain human nature to be content with that. I suspect that a genuine interest in his fellow man, such as one may acquire in the more intimate contacts of small town life, is the driving force behind many of his constructive ventures outside of business.

Perhaps the one job for which he is best known to the public is his work as head of the Chicago Boys' Club. It happened this way. Fifteen years ago he found himself foreman of the Cook County grand jury. The experience made a lasting impression on him, and one that has proved of inestimable value to thousands of Chicago boys ever since. In that jury box he was in first-hand position to observe the vast proportion of youthful offenders that kept the courts cluttered up. Here was a chance to get at the root of an evil; to accomplish a little something worth while in helping to direct human nature where wise direction would count the most—at the source.

Many a man has been convinced of the same need. Yet only one out of ten thousand would translate that conviction into hard, personal work. That one happened to be Hughes. For, before very long, he became president of the Chicago Boys' Club, giving much of his time and energy toward rendering it more effective. For some years the club consisted of three branches, each located strategically in some crowded section of the city. Two more of these branches are now under way. As a result, the five centers will serve a wide and heterogeneous cross-section of the city's youth.

"After all, it's largely a matter of hero worship—this boy problem," Hughes believes. "Boys run in gangs as naturally as smoke rises. They always will. Then some youngster steals a milk bottle, say. What happens? Why, suddenly he has become a sort of hero in the eyes of his friends. That milk bottle may well be the beginning of several lives of crime unless the hero worship is harnessed and guided along constructive ways. We turn our boys' energies to athletics. There's nothing better to furnish a legitimate background for the same sort of hero worship that formerly went with crime.

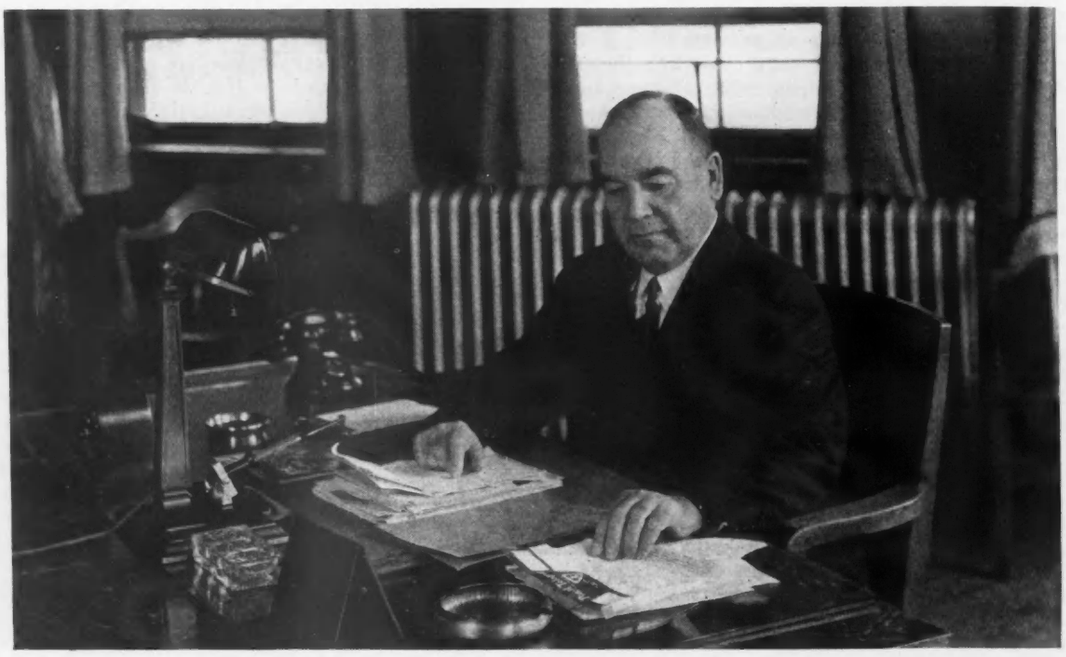
"That an organization like the Chicago Boys' Club is of practical value in the life of a great community is proved, I think, by records. We know, for example, that 7 out of 100 lads living in Chicago's slums find themselves haled into court for some offense or other. But it is encouraging to us to observe that only 2 out of every 100 members of the Boys' Club get into trouble."

After serving as president for some years of the club proper, Hughes today is playing an even more important rôle as president of the Chicago Boys' Club Foundation. Among contributors to the club activities, there long was a fear that the organization, like other good works, might in time peter out. In order to prevent such a possible disaster, the foundation was conceived. This consists of a group of five men—three bankers, another member of the club, and Hughes himself—which supervises a fund to the end that the club's activities may be perpetuated through an ever-expanding endowment.

Thus Hughes has succeeded in injecting a sound and permanent policy into an unusually effective system of boy guidance. And I have no doubt that he gets more solid satisfaction out of that than from any "kick" he may get out of developing a manufacturing business.

And then Hughes has his recreational side, too. It isn't all work with him. You can tell that by the lines of humor in his face that persist even when he's talking business. Maybe a high score in trap shooting serves to preserve them. Or perhaps it's an occasional near-hole-in-one on the course of the Riverside Golf Club, of which he happens to be president.

Whatever it is, you can put down a love of good sport as still another side to the man who, with a frontier heritage, has made his force felt in journalism, invention, manufacturing—and practical human service. Here is a man whose works will live long after him.



"Hughes is a solid, powerfully built man with a round, genial face that bespeaks a keen sense of humor."

When OILLESS BEARINGS "Fill the Bill"

OILLESS bearings as a descriptive term is, in many cases, the same sort of misnomer that Wireless Telegraphy is. Just as wireless communication devices in themselves contain wire in great abundance, so do most kinds of oilless burners have oil. But, after all, there is no wire interconnecting the radio sets, nor is there oil to be applied, as a maintenance matter, in oilless bearings. So essentially they are oilless.

The oil that is in these types of oilless bearings which contain it is entrapped in the pores of the bearing material where it is ever ready to serve as a lubricant when in operation. But the "oiling" is done by the bearing manufacturer and not as a day-to-day nor even a year-to-year nuisance to the user. Nor is there enough of it to drop out and ruin the product on which it might fall, or in the case of motor bearings, to get on the commutator with the attendant troubles.

The story is told of how the first oilless bushing came to be made by the builders of a mill in the province of Pennsylvania, way back before the Revolutionary War. Metals were then scarce and hence costly. For lack of a better material to employ, the builders of this mill installed the machinery on bearings made of plain hard wood.

Each day for many years the miller conscientiously oiled these wooden bearings until finally they became so thoroughly saturated and impregnated with oil that they needed no further lubrication. Finally the miller observed these conditions and so ceased his oiling task on these bearings.

From that time on, for decade after decade, these bearings continued to give good service without the slightest lubrication attention. Thus, the story goes, was born at least one type of oilless bearing as manufactured today.

So-called oilless bearings, as used nowadays, find application in places where oiling is especially undesirable, or where the bearings are difficult of access and are hence likely to be neglected as to maintenance. Also, they are desirable where dripping of oil is particularly to be guarded against, as in the food industries, textiles, etc. Thus they find themselves in quite general use in a wide variety of appliances and other motor driven equipment.

Oilless bearings are mainly of three different types. First, there is the hard wood bearing impregnated with oil, wax or paraffin. Then there is the bearing made of bronze with graphite inserts. And, third, comes the bearing of porous metallic alloy, which absorbs some 25 per cent of oil by volume. There is still another which consists of hard maple reinforced by babbitt metal, the wood shell of which serves as a lubricant reservoir because of its oil absorption.

With wood bearings, the applications are, naturally, much more limited as to loads, speed, etc., than for the other types of oilless bearings, but even within these limitations the service rendered by them is excellent. It is common to find installations of these wood bearings still in satisfactory service after twenty years of everyday use.

As to loads, one manufacturer of this type of bearing claims satisfactory operation up to 100 pounds to the square inch of projection area and a temperature up to 125 degrees Fahrenheit. In price, these bearings run about one-half or less as compared to ordinary metal bearings.

Bearings of this sort require a free running fit. They need somewhat greater clearance than metal bearings to bring about a proper adjustment between the shaft, which expands, and the bearing, which contracts from friction.

The second class mentioned—the bearing of bronze with graphite inserts—is a true oilless bearing in that graphite is the only lubricant, and this is, of course, dry. Hence it is particularly applicable in installations operating under very high temperatures. The speed and load limits on this type of bushing are, of course, lower than those on oiled bearings.

Design of the graphite inlaid grooves is varied with each bearing according to its application. The graphite lubrication can be provided on either outer or inner bearing surfaces, and also on flanges to take up thrust.

Generally speaking, the prices for this graphite type of bearing compare very favorably with the roller or ball bearing, but are higher than plain bronze bearings. The third type of oilless bearing comprises those made from special pulverous metal which has been compressed and heat-treated in such a way that a true alloy of porous structure results. So porous is this that it is capable of absorbing fully 25 per cent oil by volume.

To the eye this bearing looks like ordinary bronze, but a touch of the hand indicates an oily surface. The slightest increase in temperature brings additional oil to the surface, thus providing for additional lubrication. Upon cooling, this lubricant is absorbed by the walls of the bearing, leaving only a slight film at the surface.

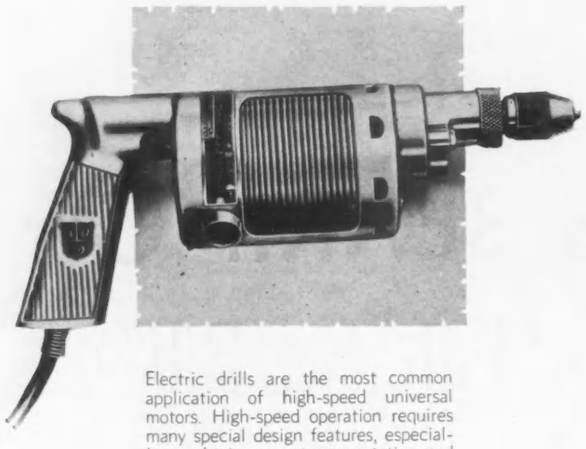
From the design point of view of a machine manufacturer, it is interesting to note that since this type of bearing is manufactured to very accurate and uniform die-cast dimensions, no reaming of the bore is required. This, of course, tends to cut the cost of production.

The price of this type of oilless bearing depends largely upon the quantity, since special dies are required in their manufacture. In any except the very smallest quantity, the price compares quite favorably with that of plain bronze.

MOTOR

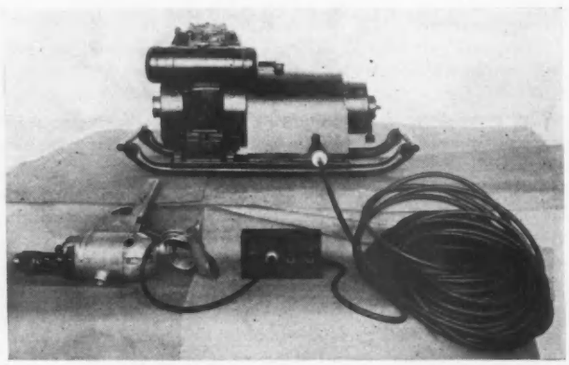
In Portable Tools Small

At the heart of the light weight portable tool is a high speed universal motor. It must be high speed to have enough power. The manufacture of these tools has brought up a new set of problems for both the engineer who builds the motor and the engineer who applies it



Electric drills are the most common application of high-speed universal motors. High-speed operation requires many special design features, especially to obtain correct commutation and ventilation

THE substitution of mechanical power for "elbow-grease" and backaches has progressed so rapidly since the close of the great war that few of us realize the extent of the revolution. The steam shovel, the ditch digger and the tractor attract attention to themselves by their spectacular performance and the noise which they make. Vacuum sweepers, washing machines and hair dryers

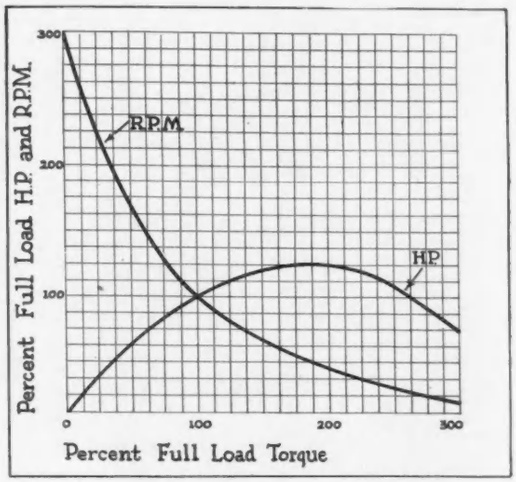


A small gasoline engine generator set for providing power for portable tools. These units are used on building jobs where electric lines have not been run. The unit is slid about on the runners shown

get into our homes and make themselves known. But there is another class of labor savers, working singly or in small groups which attract little attention, but are of great importance economically because there are so many of them, and because of their ability to perform quickly and cheaply tasks which were formerly done by hand labor. These mechanical helpers, called portable tools, include such machines as drills, hand saws, hammers, screw-drivers, paint sprayers, and floor surfacers.

The manufacture of these tools has brought up a new set of problems for the mechanical and electrical engineers. Because it is necessary to concentrate considerable power in a small space, high speed commutator motors are very generally used. Such motors have the added advantage that they will operate equally well on any commercial circuit from d.c. to sixty cycles, provided that the voltage is correct. The "high cycle" polyphase motors frequently used in industrial plants, and which require a frequency changer between the supply line and the motor need not be considered here.

These series wound motors having an operating speed of possibly ten thousand r.p.m. and a no load speed beyond the safe limit must have rotating parts built with a degree of care quite unnecessary with armatures operating at the speeds common with induction motors. Care must be exercised to insure that the unloaded speed does not go beyond the safe limit. Possible troubles resulting from high unloaded speeds are shifting of commutator bars, windings or slot insulation due to the tremendous stresses set up by centrifugal force, thus throwing the armature out of balance; and heat resulting from brush friction melting solder in commutator bars, thus permitting the wires to be thrown out. When unloaded the armature speed will, of course, increase until the torque developed is balanced by losses. The losses which increase with the speed are copper I^2R and iron loss within the motor; and friction and windage losses. A large ventilating fan with ample intake and outlet areas for the air moved is essential and serves a dual purpose. First, the motor is kept at a safe working temperature; and, second,



A typical characteristic curve of a universal motor used in portable tools. These motors are series wound and operate satisfactorily on d.c. and common commercial frequencies of a.c. Starting torque is very high

SELECTION

Motors Do Big Jobs

By B. H. CHATTO
General Engineering Dept.
Westinghouse Elec. & Mfg. Co.

the power absorbed by the fan increases very rapidly with the speed, thus providing a very effective speed limiting device. Therefore, the proper design of fan and air ducts has a very important bearing on the success of the tool. Equally important is liberal space between windings, terminals, brush holders, etc., and the motor housing. Dust, grease and metal chips have a way of collecting on live parts to bridge across to "ground," thus causing serious trouble. For most tools a reducing gear is necessary between the motor armature and the tool. Since in most cases the motor manufacturer supplies only the wound armature and field structure, the tool manufacturer must assume the responsibility for correct assembly.

When portable motors are used on circuits of more than 150 volts, the National Electric Code requires that motor frames be permanently grounded as a means of protecting the operator from accidental shock. This practice requires that polarized attachment plug be used, and in some cases a separate grounding wire within the cable will be required.

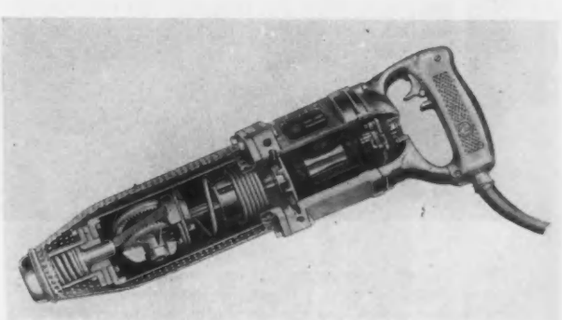
Motor Ratings for Portable Saws

Diam. of Saw	Depth of Cut	H.P.	R.P.M.	Gear Ratio
6″	1¾″	½	7500	4½:1
8″	2½″	¾	7500	3-2/3:1
10″	3½″	1	5500	5-2/3:1

Motor Ratings for Portable Drills

Drill Size	H.P.	R.P.M.	Gear Ratio	Vent. Air Cu. Ft. Per Min.
¼″ Light Duty	1/6	8500	7 or 8.5:1	12
¼″ Heavy Duty	¼	10000	8 or 12:1	18
⅜″ Light Duty	¼	10000	8 or 12:1	18
⅜″ Heavy Duty	½	6500	15 or 17:1	25
½″ Light Duty	½	6500	15 or 17:1	25
½″ Heavy Duty	⅝	7000	Approx. 25:1	50
¾″ Light Duty	⅞	6500	Approx. 30:1	50
¾″ Heavy Duty	1	5500	Approx. 35:1	65
⅞″	1	5500	35 or 40:1	65

Portable saws are being introduced into the building industry with surprising rapidity, due to the high cost of labor in this field. These units use motors ranging in size from ½ to 1 horsepower (see accompanying table)



In electric hammers ingenious mechanical devices transform the high speed rotary motion of the motor armature to the reciprocal motion required. Constant vibration requires careful selection of motors for this application

Tool manufacturers and dealers should keep in touch with the electrical inspectors in their territory.

The method of balancing rotating parts commonly practiced on moderate speed machines is entirely inadequate with these high speed motors. Dynamic or running balance is essential for producing a smooth running tool; and it is essential that the complete rotating element be balanced together. Therefore, the ventilating fan should always be furnished as a part of the motor armature and should not be easily detached. Since any shifting of wires on the armature will destroy the balance motor manufacturers have had to develop a special technique for treating these armatures. For this reason, any rewinding by repair shops should be avoided.

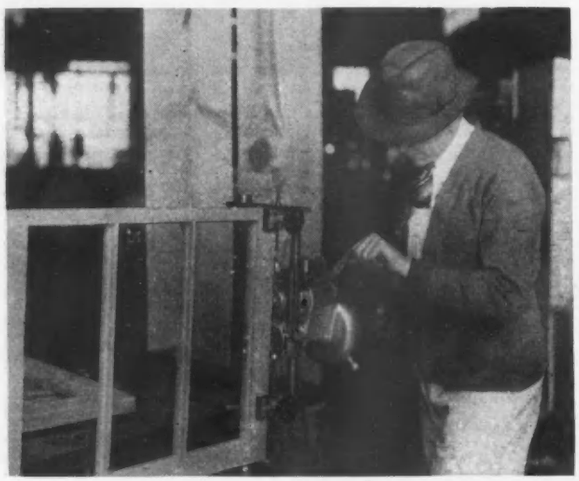
The curve shown on page 44 is representative of motors used. Although having considerable overload capacity in torque, these motors have a horsepower rating near the maximum; and are, of course, rated on a short time basis,

since continuous operation under load is not required.

The electric drill is probably the most widely distributed of all portable tools, every garage and repair shop having one or more. After long experience with these tools the manufacturers have determined the gear ratio and horsepower rating for the various sizes. The data in an accompanying table is not from any one manufacturer, but may be regarded as representative of the industry.

These tools are used for tapping and reaming operations as well as drilling.

Interesting tools adapted from drills by a slight modification are screw-drivers and "nut runners" or "bolt tighteners." These tools have the same general appearance as the drills, but are built with a larger gear ratio in order to obtain slower speed and greater torque at the screw head. A clutch permits quick unloading of the motor when the screw is set. Since the screw-driver and nut runner must operate in either direction of rotation, it is necessary to select for them a type of motor having the brushes normally set in the neutral position.



This mortiser replaces the old hammer-chisel method of mortising for locks. It is astonishing the number of machines there are now on the market for doing carpentering operations. Each machine is a special motor problem

For centuries a very large part of the skilled carpenter's time has been occupied by weary pushing of hand saws. When the carpenter's wage became two or three cents a minute, contractors realized that his skill could not be economically applied to a hand saw, and the portable electric saw was developed. An impartial survey made on a building job involving considerable sawing showed that two men with electric saws did as much work as eight men with hand saws. Taking into consideration all fixed charges and maintenance, the saving effected by two saws was $68.45 per day.

Electric saws are rated in maximum depth of cut.

Another very interesting tool of value to building contractors is a motor operated "lock mortiser" which displaces the brace-and-chisel method of mortising doors for locks, and recessing window frames for sash weight cords. Once set up for a job, this machine will cut any number of lock mortises all exactly alike in less than one minute for each complete mortise and face plate recess.

Motor operated planes, sanders and floor surfacers also help to combat the high cost of building.

Because of the necessity for light weight, and the constant vibration, the electric hammers are probably the most difficult class of portable tools for the motor manufacturer. Yet series wound commutator motors have been successfully applied to these tools. Ingenious mechanical devices transform the high speed rotary motion of the motor armature to the reciprocal motion required.

Another type of electric hammer employs no motor, but derives its power from electric magnets. A very ingenious combination of electric circuits accomplishes the reversal of power without making use of any mechanical contacts. Alternating current is separated into positive and negative pulsating waves by one of the familiar full wave rectifiers. Thus each of the two magnets is excited for one half cycle. The weight of the moving piston and its travel are so proportioned that its natural period corresponds to the frequency of the a.c. circuit.

Although compressed air hammers still hold their place on construction work, the electric tools find many applications where it is not practical to install air compressors. An electric hammer capable of handling a one inch star drill in stone or concrete can be easily carried with all necessary accessories by one man, and it can be used any place where electric current is available.

The slow, sloppy paint brush is rapidly being displaced by electric power driven equipment. Sprayed paint gets into the minute crevices which would only be covered over by brushed paint, therefore, the air brush or sprayer makes possible better work than can be done by hand, and at considerable saving in labor. Reports from a number of jobs indicate that one man with a sprayer can do as much work as from three to five men with brushes; a saving of from twenty to fifty dollars a day, depending on the nature of the work and the cost of labor. Until recently the only paint spraying outfits available were heavy and expensive; but the little high speed universal motor has been combined with a compressor unit to produce a spraying outfit which is truly a portable tool.

Old-fashioned is the paint brush, even in the home. Now a small electric compressor and a spray gun do the trick. Larger units paint machines in production and the interiors and exteriors of buildings

Portable gasoline-electric power plants are used by many contractors when no central station power is available. At first, the standard farm-light-and-power plants were used. A demand for a truly portable power plant has been met by combining light weight high speed air cooled gasoline motors with specially designed compound wound direct current generators.

Exporting to CHILE

ARTICLE 6 of a series on exporting electrical products to the twenty republics of Latin America. The next article, which will appear in an early issue, will discuss the problem of exporting electrical products to Cuba.

By WILBUR T. GRACEY

Twenty-five years United States Consul abroad

NO country in South America is of more interest to exporters of electrical goods than Chile, that long, narrow republic that stretches—like a snake—for over three thousand miles along the Pacific coast.

The Chilean people are up-to-date in thought, more adaptable than most Latin-Americans, quick to adopt new ideas, and known as the "Yankees of South America."

¶. . . "one of our best markets for electrical goods . . ."

It is not strange, therefore, that Chile constitutes one of our best markets for electrical goods and that last year we exported more to that country than to any others in South America except the Argentine and Brazil.

Chile has an area of 289,599 square miles, with a population slightly in excess of four millions. It may be roughly divided into four sections: The northern, or tropical part, where the great nitrate borax deposits exist and where there is little rain, vegetation being confined to small valleys helped by irrigation. The second zone, with important mineral deposits of gold, silver, copper, cobalt, nickel, lead, iron and manganese, is where the Andes reaches the highest point. Here there is slight rainfall and the only important product cultivated is grapes. The third section—generally known as the "central" or "agricultural zone"—is the lower mountain area. Here a central valley is crossed and recrossed by numerous rivers, most of them with rapid current suitable to the development of water power. Climate is temperate, rain abundant, soil fertile, and farms abound. In this section there are important forests, coal and mineral deposits. The last section is where the central valley falls away to the coast, with abundant rain, immense forests and good pastures—a cattle and sheep raising district.

¶. . . "38% of the population lives in 5% of the area . . ."

Thirty-eight per cent of the population of Chile lives in the central valley, although the area only constitutes 5 per cent of the area of the country.

All of the country's commercial activities radiate from Santiago and Valparaiso.

Santiago, the capital, with a population of 600,000 lies inland 72 miles from San Antonio—its nearest port—and 117 miles from Valparaiso.

Valparaiso is the principal Pacific port in South America and Chilean enterprise is evidenced by

the growing number of manufacturing industries springing up around the city. There are important sugar refineries, coffee roasting plants; beef, fruit and vegetable canneries; candy, cracker and spaghetti factories; manufactories of clothing, textiles, shirts and collars, rope, furniture, shoes and leather goods, chemicals, cigarettes, enameled tin and aluminum ware, wire, construction materials, paper and other products.

With a population of 200,000, the city is imposing—built along the foreshore and on nineteen hills. There is an excellent electric tramway system, the main streets are lined with modern office buildings and stores, and in the wholesale district there are large displays of machinery for mining purposes, engineering work, agriculture, road building, construction work, farming, etc.

¶ . . . to which the residents are transported by funicular railways . . ."

The city has much of the aspect of the larger European places and its lower levels are given up almost entirely to business. The residences—which are modern and attractive—are mostly situated on the upper levels, to which the residents are transported by funicular railways.

More than half of the imports of Chile enter at Valparaiso, and while the city is of great importance to the exporter, and most of his products will be shipped to, or via that port, the real market center of the country is at Santiago, the capital.

Santiago is an unusually beautiful city—many consider it the most attractive city in South America. Surrounded by snowcapped mountains, the city lies in an amphitheater of hills, and the many buildings, both public and private, are striking architecturally and modern in construction.

A network of electric cars affords excellent transportation facilities, and railways operate to both the Atlantic and Pacific coasts.

All kinds of electrical goods are marketed in Chile, and American goods are popular. As in most South American cities, however, price is an important consideration with the buying public, and our trade is somewhat handicapped by high prices of our commodities.

Prior to the war, Germany was strongly intrenched here, but American electrical manufacturers secured a good footing during the war period and in the years that followed, and though the Germans have been making strenuous efforts to regain this trade, we still hold a leading position, and our exports are increasing annually.

¶ "Our exports last year were $3,383,086."

Electrical goods imported from Germany in 1928 were valued at approximately $1,902,180, increasing last year to $2,830,400. Our exports last year—1929—were $3,383,086. These figures are based on information received from the Department of Commerce.

German and British manufacturers, having been long in the Chilean market, are able to take advantage of every opportunity. They usually have their own branch offices in Santiago and Valparaiso, carry large stocks, and also the Germans receive much material on consignment, with which they try to met competing prices.

The British are strongly intrenched as a result of an exceptionally good system of distribution. They have agents in all the principal cities of Chile, but are handicapped in competing with the Germans in the same way that we are, their goods being of high quality, and consequently commanding higher prices.

There is a certain class of Chilenos, however, which considers quality before price, and the number of these is growing. In consequence, American firms who have given the trade careful attention, handled it with intelligence, advertised and carry stock, are successfully competing against cheaper priced German goods.

France, Belgium and Italy, also do considerable trade in Chile, but the strongest feature of the Chilean situation is the phenomenal "come-back" which is being staged by German firms, aided by German sales propaganda in the home country and in South America.

¶ " . . . regarding electric light and power plants . . ."

According to the latest available data regarding electric light and power plants in Chile, fifty installations are listed but this is not believed to be complete. Of this fifty, 35 deliver direct current, usually of 220 volts. Of the balance that supply alternating current, only four plants are of 60 cycles, the other being of 50 cycles.

This, of course, materially affects the sale of our products in that market.

Chilean practice does not conform rigidly to the standards of any nation. The contracting business is largely in the hands of a few firms, who are licensed by the electric companies, but this does not prevent many smaller firms from doing small jobs and repair work. The installations are inspected, before use, by the electrical company supplying the power, but these inspections are very casually made in places outside the large cities.

Chilean type of building construction does not lend itself readily to concealed wiring, but this is being used in most of the modern buildings. The common method is to use exterior wiring through metal molding, with flexible twisted wires, or rubber covered wire, in the smaller dwellings. Flexible wire is also used generally for drop lights. Where interior conduits are used, steel conduit or armored cable is required. All conductor wire must be insulated and conform to the German standards of Siemens-Schuckert or the A. E. G.

Rotary switches are in general use, both in buildings and dwellings, except where there is concealed wiring, when push buttons are used.

¶ ". . . receptacles of the plug type, bayonet sockets, Edison plug fuses . . ."

Sockets are of the Edison screw type and receptacles of the plug type. Bayonet sockets are used by the State railways.

Edison base plug fuses with porcelain, or composition bases are used with either a mica or brass plate top. For power lines the American type of cartridge fuse is coming into use. Where amperage is above 80, the open link lead wire fuse is common. Knife switches are of open type and American safety type are now obtainable for use with American made motors.

Chile, being a mountainous country, with many rapidly running rivers in the most densely populated region, has made great strides in the employment of hydro-electric power. It is only within recent years that this development has taken place, because of heavy investments sunk in steam power plants. Gradually, however, industry has demanded cheap power, and the hydro-electric plants are now replacing the earlier steam units. The economy of the hydro-electric system, and reduced price charged for current, is increasing the use of electrical equipment and prospects of future development are encouraging.

Naturally the standards and practices which have developed have been those of the nations who have made the installations. German influence and German equipment predominated until the outbreak of the war. This gave us our opportunity and we were able to demonstrate the superiority of American equipment. In 1918 the British secured control of the German subsidiary companies in Chile, since which time they have increased their productivity and improved the service.

During the early part of this month—August—according to a United Press despatch—the Federal Electric Service Commission of Chile is said to be putting the finishing

"... providing for the nationalization of all light and power companies."

touches to a measure which will be submitted to congress, providing for the nationalization of all light and power companies. This bill will authorize the government to expropriate existing foreign-owned electric light and power concerns. Funds for the purpose will be raised through loans floated by the government, and Chilean owned companies are to be assisted, according to the measure, with capital furnished by the Government at attractive interest rates. If this measure goes into force it will probably have a wide reaching effect and materially change the present electric trade of the country.

Santiago and Valparaiso, and nearby towns, secure their light and power from the Compania Chilena de Electricidad, which is the largest company in the country and controls the street car systems of these cities. It operates several hydro-electric plants in the vicinity of the capital and also has a couple of small auxiliary steam plants.

Most of the transmission lines in Chile are carried on steel towers, with seven-disk type suspension insulators, and in some cases steel and concrete poles are used. Wooden poles are used to some extent for distribution lines, but are gradually giving way to steel and concrete poles even in the suburbs of the larger cities.

Hydroelectric plants have also been installed by a number of the mining companies.

"A large coal company has a fifty years' concession to supply light and power . . ."

Many of the plants which serve cities outside the central area are owned by individuals, or concerns, made up of foreigners residing in Chile, and do not strictly follow the system of the Compania Chilena, but depend upon their individual requirements. A large coal company which operates mines at Marfil, has a fifty years' concession to supply light and power to the city of Valdivia and near-by towns. The Chile Exploitation Co. operates a large steam plant generating 93,000 kw., and transmits power from the coast to their mines lying 144 km. away. They maintain a line voltage of 110,000 volts.

The Anglo Chilean Nitrate Co., has electrified its railway line, obtaining power from a Diesel plant.

The second largest distributor of light and power, the Compania Industrial de Electricidad, supplies power to the provinces south of the capital, securing about 30 per cent of its power from the Compania Chilena and developing the balance in steam plants.

Electric power is largely used in the industries of the country. Coal mines use it to a considerable extent, over 200 having been listed as consumers of electric power. Its use in manufacturing is fairly general, although it has not supplanted steam by any means. In many districts, owing to shortage and high price of coal, electrical power is considerably more economical.

"... an open market for almost everything electrical."

Chilean companies are being given special consideration by the government, and most of the government's contracts for goods are given to their own nationals, even when foreign goods of equal or better quality can be obtained at lower prices. Import duties are of a protective nature, and these duties are modified from time to time to encourage Chilean manufacturers.

The list of exports given earlier in this article will show the type of goods which we are shipping to Chile. The country may be considered an open market for almost every-

United States Exports of Electrical Apparatus to Chile for 1929

From unpublished figures supplied by the Department of Commerce
(subject to revision)

Insulated copper wire and cable	$445,208	Insulated iron or steel wire and cable	$16,366
Copper wire (bar)	208,184	Electrodes for electric furnaces	16,285
Motors, 1 to 200 h.p.	202,344	Sockets, receptacles and lighting switches	16,140
Other electrical apparatus not especially covered by other items	196,710	Industrial electric furnaces and ovens	15,157
Accessories and parts for motors	138,047	Globes and shades for lighting fixtures	14,916
Electric lamps, metal filament	113,769	Therapeutic apparatus, etc.	14,377
Radio receiving sets	101,335	Starting and controlling equipment for railways and vehicles	14,162
Other telephone equipment	67,320	Telegraph apparatus	13,276
Electric locomotives mining and industrial	54,818	Portable electric tools, except automotive	12,543
Other wiring supplies and line material	53,202	Electrical porcelain for 6600 v. and over	12,476
Railway signals, switches and attachments	49,129	Motors, over 200 hp.	12,300
Flashlights	45,065	Electric fans	12,121
Interior lighting fixtures	45,016	Rubber and friction tape	11,711
Metal conduit, outlets and switch boxes	40,354	Electrical glassware, except for lighting	11,445
Starting and controlling equipment for industrial motors	35,707	Telephone instruments	11,052
Telephone switchboards	34,782	Radio transmitting sets and parts	10,628
Other carbon products	31,862	Other motor driven devices, except tools	10,339
Radio tubes	31,577	Searchlights and projectors	10,110
Loud speakers	31,387	Railway motors	8,800
Refrigeration sets up to ¼ ton capacity	26,551	Electric railway locomotives	7,707
Electrical porcelain for less than 6600 v.	26,358	Street lighting fixtures	7,384
Other domestic cooking and heating products	26,085	Electric flatirons	6,496
Other radio receiving set accessories	23,126	Other starting, lighting and ignition equipment	6,396
Refrigeration sets over ¼ to 1 ton capacity	22,611	Other electric lamps	6,355
Motors, 1/3 hp. and under	22,381	Motors, over 1/3 and under 1 hp.	5,105
Radio receiving set components	19,879	Vacuum cleaners	4,857
Spark plugs	18,320	Electric washing machines	2,945
Insulating material	16,971	Bells, buzzers, annunciators, etc.	2,187
Electric cooking ranges	16,542	Automotive electric machine tools	209

thing electrical, with few exceptions. Notice that there are fifty-eight different items in the table on the previous page.

Batteries and flash lamps find a ready sale, but are not used to as large an extent as in the United States. There is only a limited call for automobile batteries, due to the small number of machines. Flashlight batteries command a large market and are used to a considerable extent in the mining areas.

The call for domestic electric goods is not as large, by comparison, as in this country, due to the fact that servants are cheap and plentiful with salaries ranging from $8 to $15 per month. Few of these servants know how to use electrical apparatus and the Chilean housewife pays little attention to housework.

Recently there has been a shortage of living accommodations, with the consequence that families are being compelled to take to smaller houses, or apartments, where servants cannot be easily accommodated. The result has been a growing demand for electrical devices, which are recognized as labor savers, especially in the districts where cheap current is available. This is not always the case in the smaller cities of Chile, and in some places the rate is high, $0.253 per kw. hr. In Santiago and Valparaiso a "domestic schedule" is now in operation, which makes it possible to use domestic electrical appliances in competition with gas.

¶ " . . . a domestic rate of 3c. per kw. hr. . . . "

A rate of approximately 12c. operates in these places, and a domestic rate of 3c. per kw. hr. makes the use of electrical apparatus inexpensive. The result in the increased sale of household apparatus has not been what was expected, but sales are increasing all along the line.

Electric fans are very generally used in office buildings, theaters and other public places, but are very seldom seen in the homes. The wealthier classes who might use them, live in homes with thick walls and high ceilings and as the days are never intensively warm, the use of fans is hardly a necessity. Desk fans of 12 and 16 in. type, brass finished, are those usually seen in the stores. The sale of ceiling fans is small. Exhaust fans are used to some extent, but confined almost entirely to theaters, restaurants and public buildings. Most of the fans in use are of German manufacture, owing to lower prices. Exporters of fans should remember that Chile's hot weather begins in October.

Laundry equipment has found very little sale, as a family wash can be sent out and done for about $6 a month. Only a few of the wealthier homes have installed washing machines or ironers. In the public laundries, however, electrically operated machinery has been installed, and one laundry in Valparaiso is using over 40 washing machines, besides other electrical equipment.

Electric irons may be said to be an exception to the statement that little domestic electrical apparatus is used. They are coming into general use, and are found in the majority of better and middle class homes. American irons held this trade for a long period, but recently aggressive German sales methods have increased the sales of German products. 3 lb. and 5 lb. irons are most in demand. Tailors, generally stick to the old type of iron, but as there is a general tendency of the Chileans to modernize everything, the electrical type of iron is finding a market gradually even among the tailors.

¶ " . . . demand for vacuum cleaners fair and steadily growing . . . "

Chilean people use rugs and carpets, heavy upholstered furniture and heavy draperies at their long French windows. As a consequence the demand for vacuum cleaners is fair, and steadily growing. Swedish importers are having considerable success in selling these on the installment plan, and following in their footsteps the German and American importers are doing likewise. It seems certain that with an intensive advertising campaign, and house to house canvass, this trade can be increased materially. Electric refrigerators are having a slow, but steadily growing sale, principally among the wealthier classes, and American importers who have been selling these are now manufacturing their boxes in Chile to reduce freight and import duties.

Three plate electric ranges are being sold to a considerable extent, as with the new domestic rates the cost of operation is estimated to be from 2 per cent to 15 per cent below gas ranges. This is an expanding market, and one which American manufacturers will do well to cultivate. Our products are in the lead in this line, but it is said that the heating elements are not as strong as those contained in the British products, and are not suited to the 220 volt current supply. British and German competition can, perhaps, be circumvented if our manufacturers will strengthen this element.

¶ " . . . an increasing sale of heaters is expected . . . "

The trade in radiators is also on the increase. Heat is only required for about four months of the year, but with the lower rates now in force, an increasing sale of heaters is expected. The circular and luminous types are those in demand, particularly the 12 and 16 in. sizes. Approximately 3500 radiators are imported annually.

There is not much call for percolators, chafing dishes, toasters and hot plates, except among the foreign residents and wealthier classes. Vibrators are sold to barber shops, but little used in the homes, and there is only a small call for heating pads, immersion heaters, violet-ray machines, curling irons, etc.

The radio trade is largely in American made goods, and there is keen interest in receiving sets. Our products are holding their own in spite of British and German competition, but Chilean broadcasting has not been entirely satisfactory so that sales have been limited. There is a live interest in short wave sets which makes it possible to pick up American and European short wave stations.

Very few electrical products are manufactured in Chile except electrical signs and some radiant heaters.

¶ " . . . most of the German companies have established branches . . . "

Competition being so keen in Chile, most of the German companies have established branches, and have sub-agents or their own offices in most of the larger cities. They carry large stocks, advertise extensively, have corps of traveling salesmen and door-to-door canvassers, and are generous in their credits.

American manufacturers depend largely on agencies which do not carry large stocks. The American manufacturer who seriously contemplates capturing Chilean trade, would do well to open a branch office in Chile, carry stock, and follow up leads in the same way his competitors are doing, or as he would do in the United States. One large American manufacturer has done this with considerable success, another concern has organized a selling company in Chile which carries stock and does considerable advertising.

Chile is one of the livest markets in South America for our electrical products, and intensive cultivation of it, using methods that have proved successful in the United States, will undoubtedly be followed by success. It may be some years before the necessary initial investment shows satisfactory returns, but there is a live opportunity of securing a constantly increasing trade with the "Yankees of South America."

Perhaps
PRESSED METAL
Is the Answer

UTILITY alone was once almost the sole demand made upon the designer of a utilitarian product. Not so now. The customer demands as well graceful, simple beauty. And what is more, he demands it at the same or lower cost than formerly. Modern achievement in the development of fabricating method has brought to the manufacturer many ways of meeting this new demand on the part of the customer.

Not the least of these modern developments is the pressed metal part. Manufacturers have found that it brings to them many advantages, for a great many purposes, over the cast and machined part, over forgings and over wooden parts. Let us see what some of them are.

Probably the first thing which appeals to anyone about pressed metal parts is their light weight as compared to castings or forgings. And this is, of course, an advantage for a great many purposes. Very frequently replacing castings with pressed metal parts reduces the weight more than half. Quite in addition to the appeal which this makes to the customer there are the great advantages to most all factory departments that the product so made lends itself fully as well to mass production methods and the product becomes easier to handle during the manufacturing process, easier to pack and simpler and cheaper to ship.

Closely allied with weight is bulk. This is cut down with pressed metal and generally increased strength results. This is particularly true when steel is the material.

Another claim urged for pressed metal is not without its just merit. It is the fact that never do hidden flaws rise to torment the factory man, as is sometimes the case when castings are used.

TOUGHNESS is another quality of pressed metal which is particularly appreciated where small parts or small cross-sections are required. Small thickness in cast parts has caused many a nightmare among production people and designers.

To make a product which will function properly is one thing, but to finish it to the satisfaction of the customer is quite another. Frequently applying final finish to a product is a long and expensive proceeding, largely because the surface has to be prepared to receive the finish coat. This surface frequently requires sand blasting, grinding and polishing. These are generally hand operations and so greatly increase the cost. But with pressed metal, the product as it comes from the press is practically ready to receive its finish coat.

Perhaps what appeals to the watchdog on costs in a plant is the fact that with pressed metal parts there is no machining to be done. They are formed to fit. With machining, the cost of production is not reflected entirely by the time cards of the workmen involved by any means. There are large fixed costs which enter by way of the large investment in machinery necessary to do the work. There is, of course, the investment in dies in the case of pressed metal parts, but this is soon absorbed in any considerable run.

ANOTHER factor in the consideration of pressed or cast metal is the saving in material. In the case of an electrically driven business machine, 12 lb. were cut from the weight by replacing a cast inclosure with a seamless drawn pressed metal case. And, of course, salability is generally increased at the same time.

Not the least of the advantages of pressed metal is the ability by its use to turn quickly to meet the quickly changing demands of the public. How quickly one is able to match these changes in demand often makes the difference between success and failure in capturing new markets. There is often far too much time between the drafting board in the design department and the shipping room door. One excellent way to shorten this time is in the use of pressed metal parts.

Manufacturers frequently dismiss the consideration of pressed metal parts on the grounds that complicated design precludes their use. Experiences of countless others manufacturers show this action to be without point. Even intricate parts may be made of pressed metal by one or another of the modern methods now available.

To show the wide range of parts of electrical products which have been successfully made of pressed metal, the illustrations at the right of this page have been prepared. Number 1 is a hair drier case stamped from aluminum in spite of its intricate shape.

A loud speaker shell of pressed steel is Number 2, and 3 is a seamless drawn aluminum tub used in a washing machine. Number 4 is a seamless case used in radio work, while Number 5 shows three different types of cone used on loud speakers. In Number 6 is pictured a built-up steel case for use in the typewriter-telegraph instrument. The dust-tight case shown in Number 7 is produced complete ready for installing the motor starter mechanism. Number 8 is the pressed metal barrel of an electric hammer.

A NAIL IS A NAIL—

With magazines and mail pieces overwhelming the potential buyer, it behooves the manufacturer to present his product attractively and tell the bulk of his story visually. The photographer comes to his aid with a new standard of pictorial representation that includes emotional as well as physical characteristics.

By LLOYD W. DUNN
Art Editor, Cage Publications

YOUR product must be well presented, of course. The clear catalog photo does that well with its white background and sharply retouched features. But does such an illustration say any more than "bearings" or "toaster"—or "tack"?

The competition for the reader's attention is keener today than ever before. Direct mail pieces engulf him—salesmen besiege him—and advertising pages use every possible method of luring him into the text.

Manufacturers often spend thousands of dollars in advertising and direct mail, and yet continue to disregard the modern trend in pictorial representation. The best of paper, ink and copy is of little avail if the illustration does not catch the eye of the reader who thumbs hastily through the pages, allotting a passing glance to each advertisement.

". . . What stops us? It isn't the stock and trade cut showing Blank and Blank's castings . . ."

Is a dramatic photograph worth the time and money spent to obtain it? The success of hundreds of users of such illustrations would answer definitely in the affirmative. But let us judge the question for ourselves, by taking any publication that happens to be on our desk and running through the advertising pages. What stops us? It isn't the stock-and-trade cut showing Blank and Blank's castings—we've seen hundreds like it before. But that illustration that shows the product from a new angle, with unusual lights and shadows—that's the one we dwell on for more than a moment and more than likely find ourselves reading the copy before we turn away.

Perhaps the chief advantage of a dramatic illustration is the emotional reaction it creates. It is attractive—impressive—and somehow makes us more conscious of the particular and unique quality of the product than any text could. It is an intangible reaction, difficult to analyze, but psychologically sound. An unusual setting creates a mood, or a desire that often is the nucleus of future sales.

While dramatic photographs are valuable, chiefly because of their ability to attract the attention of the reader, they often serve also to show many selling features of a product. The illustration at the bottom of the opposite page is arresting because of the unusual angle from which it was taken. It has a selling message, too, that says more than just "dish washer." It tells exactly what the salesman is telling the housewife: "It is a compact convenient washer that will take all your dishes and wash them clean. The washer is built into the sink and can be covered when not in use." All this took thirty-one words to describe and takes about nine seconds to read. The photograph flashes its message almost instantaneously.

It is quite possible to dramatize a product improperly and create exactly the opposite effect from that intended. Screw machine products taken against velvet drapes and glistening like rare gems are obviously ludicrous and arouse a feeling of effeminacy and weakness rather than strength and dependability. The correct setting helps to bring out the dominant quality of the article—accuracy, speed and size. In the final analysis, a proper setting is a matter of good taste.

While retouching is often necessary and valuable for bringing to the fore certain features, in general it can be said that the trend is away from the "doctoring up" of photographs. A really good photograph needs no further work on it and often loses its original charm when "snapped up" by the retoucher, who is all too anxious to spend as much time as he can on the work. If retouching is essential, then only the highest type of work should be used. It is expensive, but money well spent.

". . . his photos cost him far more than they would have if the work was properly done in the first place . . ."

There is a certain manufacturer who boasts that he gets his products photographed for half of what one might expect to pay for such work. Investigation showed that while he paid considerably less for his photographs, the quality was so poor that he spent an excessive amount in retouching these prints and bringing out the important details. With the additional charge for retouching, his photos cost him far more than they would have if the work was properly done in the first place—and the final result showed a hard, unnatural representation that was far from authentic.

The cost of dramatic photographs varies, but in large cities there is no reason why a good illustration, cleverly lighted and arranged, cannot be obtained for from eight to twenty dollars. If people are used, the price is higher as the subjects become more difficult to light and the element of movement enters in. Photos with people cost from ten to twenty-five dollars, plus a fee of about five dollars for each model used. Of course, there are manufacturers who pay a great deal more than that for such work, but they are in the minority.

BUT . . . .

when skillfully photographed with dramatic lights and shadows the commonplace nail becomes a vibrant eye-arresting article

Courtesy, John Hassall, Inc.

A DISH WASHER. . . . .

is a dish washer, you say. But how much more interesting and informative is the illustration shown below than the standard matter-of-fact representation too often used in advertising and direct mail

Courtesy, Walker Dishwasher Corp.

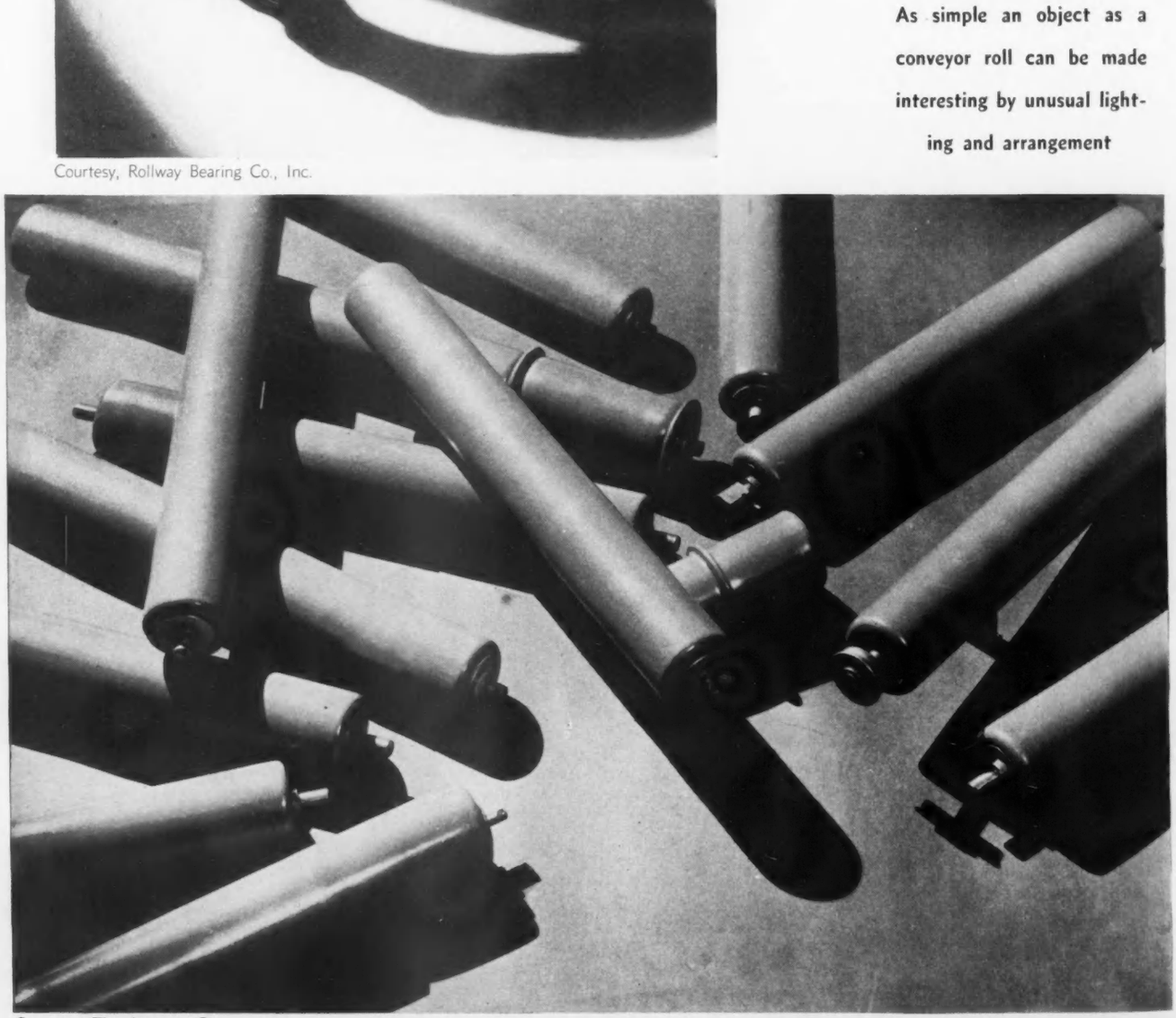
Courtesy, Rollway Bearing Co., Inc.

BEARINGS. . . .

Dramatic photography creates an arresting illustration of a bearing

CONVEYOR ROLLS. . .

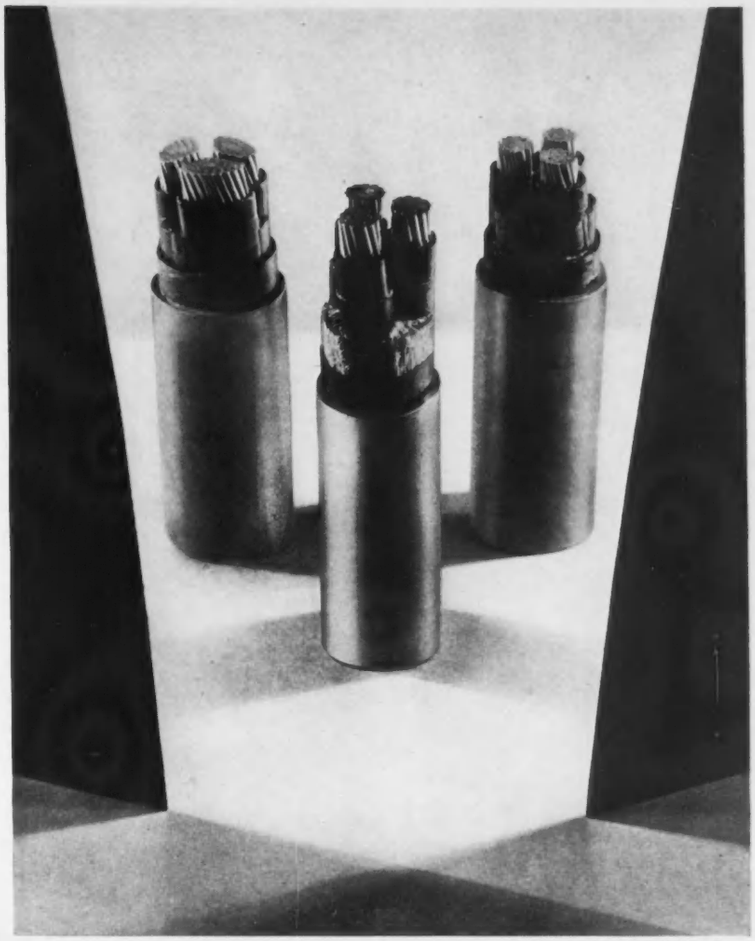
As simple an object as a conveyor roll can be made interesting by unusual lighting and arrangement



Courtesy, The Lamson Co.

CABLE. . . . .

Modernistic lights and shadows add life to sheathed cable

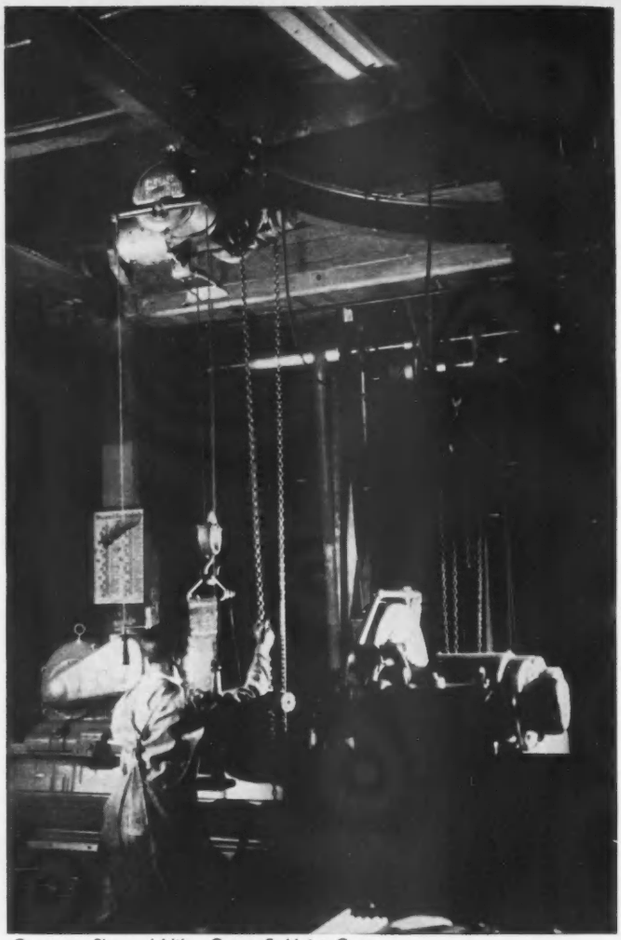


Courtesy, General Cable Corp.

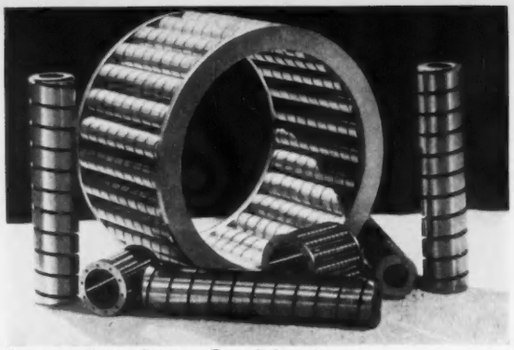
INSULATORS. . . .

An insulator test-table dramatically illustrated. Nothing fancy. Just the application of good photography

Courtesy, Corning Glass Works...Photo by Underwood & Underwood



Courtesy, Shepard-Niles Crane & Hoist Corp.



Courtesy, Roller Bearing Co. of America

BEARINGS. . . . .
An interesting arrangement of bearings, cleverly lighted and photographed against a black background

HOIST. . . . . . .
A beautiful distribution of dark and light showing the application of a hoist

ADVICE. . . . . . .
"Do you want 'Sales Talks' or one expert's advice?" A photograph that not only attracts but tells a convincing story as well

Courtesy, Johns-Manville...Photo by Seymour Hill, Inc.

Out of the Experiences of MOTOR REPAIRMEN

One Good Motor Dries Out Many Wet Ones

As a result of a fire, a number of induction motors were damp. It was very necessary to get them into service as soon as possible, while there were practically no facilities available for making any of the usual tests for insulation resistance, etc. One motor was available, however, and this machine was in good shape. The problem was solved by connecting several of the other motors to a countershaft which was already in place and driving them by belting, from the good motor. After running like this for several hours, the idea being, of course, that the windage and ventilation would dry out the motors, the windings of the damp motors were connected in series so that the total voltage impressed upon each winding was about one-eighth of the nominal terminal voltage. This current was kept on for a number of hours, not without some fear that damage might be done. However, no damage was done and when it was felt that the motors were in fit condition, they were placed in service. Fortunately—for it was pure luck—the motors stood up all right under the voltage of the circuit which was 220 volts—and operated without any apparent injury due to their wetting.

Incidentally, on low-voltage windings such as those of a 220-volt induction motor, an insulation resistance test would have been very valuable. This is made by applying direct current to the winding and measuring resistance to ground, by placing a high-resistance, direct-current voltmeter in series with the winding. About 500 volts should be applied, care being taken that the voltmeter is not damaged. The resistance of the insulation is given by the formula:

$$R = r\left(\frac{V}{V_1} - 1\right)$$

Where V = internal resistance of voltmeter, plus series resistance of voltmeter; V = voltage of circuit; V_1 = indication on voltmeter; R = resistance of insulation.

Determination of ohmic resistance of insulation is a safe and reliable guide as to the dryness of the insulation. In other words, the voltmeter or resistance method of determining insulation resistance is effective so far as concerns determining whether or not the insulation is moist or wet. The resistance measurement is not a safe guide as to the dielectric strength of insulation, which is also involved where high voltages are concerned. On the other hand, insulation that is damp or moist and so has low ohmic resistance will not have high dielectric resistance.

Faulty Commutators? It May Be Oil Oil Destroys the Mica

Oil rots mica. Trouble due to oil is not usually suspected until something happens. Then irreparable damage has been done, so that it is very important to keep oil off commutators—not a very little oil that may be put on from time to time to prevent brushes from chattering—but the oil that can reach over from the engine, from splashing and other conditions causing the mica between commutator bars to become oil logged or soaked.

Typical shut-downs due to oil may start without any warning. The armature begins to smoke, pin-wheel fire circles the commutator and before the machine can be shut down solder is thrown in every direction. Often the damage is so extensive that it is practically impossible to discover the cause of it. A close examination of the commutator will show, however, that it is soaked with oil.

"We never put oil on the commutator, so it cannot be due to oil," the operators will say. Investigation may show, however, that the engine is throwing oil on the end of the commutator. In other instances it will be found that the oil guard ring has been left off from the end of the shaft adjacent to the generator. In other cases, oil has been used in reckless quantities to improve commutation or reduce noise. In other cases, oil may drip down from above. In any case, damage to mica from oil is due to some unsuspected condition rather than intentional practice involving oil. The big thing, therefore, is to look out for oil and keep it away from the commutator as much as possible.

In many instances the application of oil to the commutator of a generator may interfere with the load distribution, the application of oil acting similar to the insertion of a resistance between the brushes and the commutator. In some cases where generators have been operating in parallel at heavy loads, and where the series field were not very well adjusted or the commutating hole shunts, or inductive shunts resulted in making the machines very sensitive, the use of oil may lead to quite serious trouble.

A Slip-ring Induction Motor That Sometimes Started and Sometimes Didn't —Cause, Brush Oxidation

After lengthy, continuous service, copper brushes sometimes oxidize due to heating, burning and sparking. In consequence, the conductivity becomes impaired and different troubles may develop. Such troubles may be difficult to find as when the copper brushes are seen to be making what appears to be good contact with the collector rings, it is usually taken for granted that there is actually good, low-resistance contact between brushes and collector rings.

In one case, a slip-ring induction motor would not start promptly. Sometimes it was run for days, starting and stopping without trouble. Then suddenly it would become balky and would not start. When tried again, it would start in good shape. The next time it was called upon to start it refused to. Naturally, an open circuit was suspected, one of those mysterious open circuits which are closed by centrifugal force but which open when the motor slows down, when the winding becomes cool or something or other mysterious and complex happens.

In the case of the induction motor, which was a 3-phase machine, an ammeter was inserted in all three phases and the machine tested. Each phase was found to be perfectly balanced. Moreover, the motor started without trouble. Later on, another test was made with the same ammeters and one phase showed no current. Other tests were made and different phases showed no current. Ultimately, the contact between the copper brushes and the sliprings of the rotor were measured and here was found to be the trouble.

The remedy was to replace the brushes and turn down the collector rings, which incidentally were found to be very hard. After all, was not this the most likely place to look?

A Wrench Drops into a Transformer Tank
Result—Pump Out the Oil
Remedy—Tie the Wrench to the Wrist

If the facts could be told, many thousands of gallons of transil or transformer oil have had to be pumped out of transformer cases because some workman dropped a monkey wrench or screwdriver into the case, while changing terminals or voltage taps. In many instances the screwdriver or monkey wrench will fall down to the floor and do no harm. Nevertheless, there is always some doubt as to just where the tool has fallen and it is then necessary to pump out the oil, a tedious task where facilities are not of the best and many hundreds of gallons of oil have to be removed.

Installation and road engineers who have much work of this sort to do, usually tie the monkey wrench or tool to their wrist by a string or a leather lace, such as is used on high boots. If the grip on the tool is lost, the tool cannot fall but is held to the man by the string or lace. This is a worthwhile precaution when working around large, oil-filled transformers.

Notches Sawed in an Induction Motor End Rings Stop Smoking During Starting

A large, 3-phase induction motor had been repaired after being burned out. Both stator and rotor had been completely rewound, the bearings had been cleaned and the whole unit painted so as to look like new. When the time came to start this motor up, however, the stator smoked and the man in charge opened up the circuit, being afraid to leave the switch closed as he thought the motor was going to burn up. There were no instruments available so it was impossible to determine just how much current the motor was taking.

Tests were made with a lamp, showing that each phase of the Y-connected winding was balanced. Various tests, of little use, showed that the rotor was apparently in good condition, also. The insulation of the stator was measured with direct current and voltmeter, indicating that this was in good condition. It was decided, therefore, to start the motor and see what happened. The motor started up all right, although the stator smoked badly. It was found after repeated trials, that every time the motor was started, the stator would smoke, the smoking stopping as soon as the motor was up to speed. No trouble developed while running, which clearly indicated that there was no trouble with the stator windings.

It seemed to be apparent, therefore, that the trouble was due to the rotor, the smoking of the stator being due to an exceptionally heavy current rush at the time of starting. Since the stator was in good condition, it would seem that the rotor had insufficient resistance, so that the starting current was exceptionally high, hence the smoke. If the auto-transformer for starting purposes had had a lower voltage tap available, the starting voltage would have been reduced, so reducing the starting current and, of course, reducing the torque (which varies as the square of the voltage).

Nothing could be done to change the starting voltage and it was decided, therefore, to increase the resistance of the rotor.

An examination of the rotor showed that all the connections were tight and secure, the bars that fasten to the armature being well soldered to the heavy cast-copper end rings and then bolted to them with steel bolts and spring washers. The simplest and most obvious way of increasing the resistance of the rotor was, therefore, to reduce the current-carrying capacity or cross section of the copper end rings. Reduce the cross section and the resistance is increased, of course. So, slots were cut in one end ring, using a hack saw. A small slot was made between each conductor and the adjacent conductors, starting on one side and going all around. The first trial did not suffice so the same thing was done on the other end of the motor, so that ultimately all slots were of the same depth.

The amount of metal removed was not sufficient to seriously weaken the end rings, while it was sufficient to materially cut down the current-carrying capacity which means increasing the resistance of the circuit.

The slots were cut cautiously so as not to remove too much metal at one time, nor more than was needed. Eventually it was found the motor had ceased to smoke so that the resistance of the rotor had been increased sufficiently.

Loose Bars Slow Down an Induction Motor

A large 3-phase induction motor had operated for many months, with complete satisfaction. All of a sudden, complaint was made that it could not be got up to speed, although the voltage of the circuit, the frequency and the load, together with belt tension, were correct and the same as ever. The suggestion was made that the trouble was due to the insulation of the rotor, which was of the squirrel-cage type, having been charred and burned. Before anything could be done about the matter, the owners had taken out the copper bars of the squirrel-cage binding, re-insulated them and put them back. The motor ran as it had formerly, namely, at the correct speed.

In solving electrical problems, it is often found that doing one thing solves the difficulty, while the trouble was due to something else. This was the case in the present instance.

The squirrel-cage rotor of the motor that had suddenly shown a drop in speed was bolted together by means of bolts and spring steel washers. The motor had been subjected to extremely heavy loads and at the time of starting the current in the short-circuited rotor had been sufficient to turn the washers and bolts blue. The current had been so heavy that the solder between the bars and the end rings had melted. The steel bolts and steel spring washers had become annealed so that the washers had lost their temper. Consequently, instead of there being a low-resistance contact between end rings and bars, the bars were loose, the contact uncertain and of high resistance. For this reason the speed had dropped.

The reason that the motor came back to its normal speed after the insulation had been put on the bars, was that new washers were put on the bolts, clamping the end rings to the bars or squirrel cage. It is interesting to note in passing, moreover, that the insulation on the bars is not really necessary so far as the insulation is concerned. The chief purpose of the insulation is to make a tight mechanical job, so that the bars cannot move around in the slots of the rotor. A secondary reason is, also, that it reduces a certain amount of leakage current from copper to iron and vice versa. The real trouble in the present instance was that the steel washers and the solder between end rings and bars had introduced a high resistance, necessitating greater slip by the motor for a given torque.

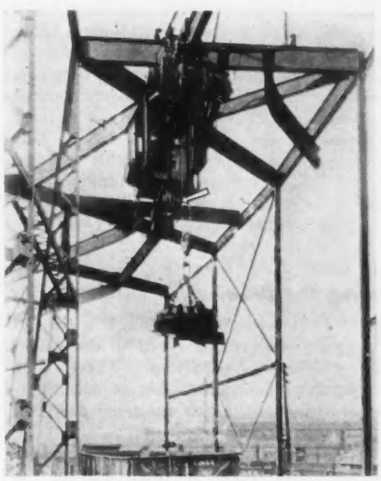
Motor manufacturers appreciate much better now than they did many years ago the importance of good contact between induction motor bars and end rings. In modern construction bars are brazed to end rings in the case of large and medium size motors, and in some small motors the bars and end rings are actually moulded into a single piece of metal.

READY TO APPLY

Eight Liftable Ideas for Cutting Costs or Simplifying the Day's Work of the Electrical Manufacturer

No Tangles in this Cab'e

WHEREVER a lifting magnet is used, it is important that the power leads be always intact. Any break in them may be disastrous. One way to insure an untangled lead to the lifting magnet is to use an automatic cable reel like that shown above, installed on the bottom of the cab of an overhead monorail traveling crane.



Retrieving "Lagging" Cords

The automatic reel, indicated by the arrow, keeps the power cable always taut.

This particular reel is equipped with a ball ring cable outlet. The cable paying out over rolling balls is not subjected to wearing friction. W. B. T.

The Right Kind of Parts Catalog

WHEN you have occasion to make up a parts catalog on a machine or piece of equipment, it's a good plan to make simplicity and clearness the dominating features. Of course, it should be complete, for no list should be printed that doesn't do the whole job.

A mistake very often made by those making up these lists is to forget that the product is only one of a large number to the man that is going to make use of the parts list. He must not be expected to be familiar with details nor to know as much about the article as the men who build and sell it.

As a rule, the article covered by the parts catalog is completely disassembled, and the various parts spread out and photographed. Numbers are usually given each part, and below the photograph a complete list with both numbers and names.

A good plan in connection with the photograph work is to keep together as much as possible the parts that make up the various sub assemblies. For instance, where there is running gear the axle, wheels, bearings and washers would be shown in the same section. It helps the man who has to scan the list for what he needs.

Many of the parts look very much different photographed than they do on the assembled unit, for one gets a different view of them. Therefore, the plan used by some firms—to show the completely assembled unit with arrows pointing the various parts and numbers affixed to the arrows—is a very good one. A parts catalog that includes photographs, a list, a full photograph of the article, and last, a set of instructions for its use is close to being 100 per cent efficient. T. F. M.

Doing Double Duty

THE railroads have done an excellent job of getting something like maximum results from the available equipment. The average carload today is considerably above the figure of five years ago and very much ahead of the fifteen years ago figure. Every engine is pulling more tons day after day than was thought possible some years ago.

There is much equipment in industrial plants today that is not being worked even near the limit. Not that getting the last ounce out of anything continually is to be recommended, but it is possible to increase the output of some machinery and equipment by 25 per cent without risk.

A case in point is the electric lift truck which hauls loaded skid platforms. Usually the capacity of these machines is 5000 or 6000 lb. Conditions prevent the loading of more than 3000 lb. or so on the skid platform, but it is possible to get the truck to do its full job by attaching a trailer load to the skid platform, as pictured below.

A wire concern in the East does this continually, and it is figured that the cost of moving the goods is reduced by a good margin. The hauls in their case are long, so it means something to eliminate a dozen or more round trips of the truck by having it do sort of double duty.

Perhaps many firms just now are not worrying about being able to move all their output because production may be low, but it may be only a short time before these firms are forced to look for short cuts. This idea is worth making note of.

T. F. M.

What Does Good Light Cost per Man?

ABOUT a year ago in one plant 16-in. reflectors with 200-watt lamps were installed on center distances of 10 ft. by 10 ft., 10 ft. above the floor. This height was to obtain as thorough diffusion as

Why Not Use that Surplus Power?

Industrial lift trucks are often capable of pulling larger loads than they carry. If so, towing another truckload means a saving of time.

No Running After Labels

Everything that the shipping clerk needs is to be found in this caster-mounted pigeon-hole truck—labels, shipping forms, tags, and so on.

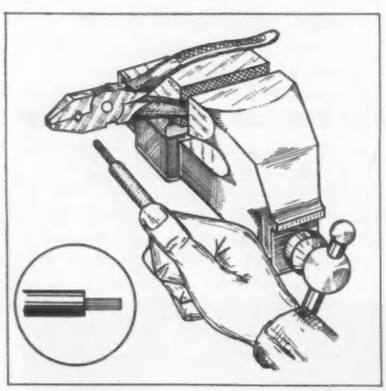
possible. The intensity was about 14 foot-candles.

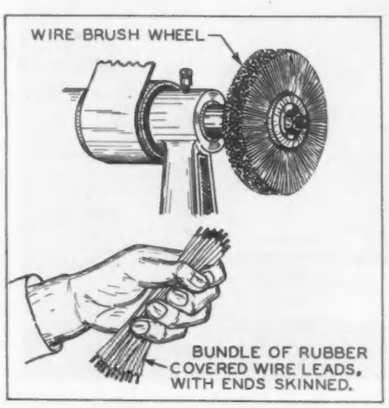
The system displaced was of the same general type, but comprised 16-in. units with 150-watt lamps, spaced on centers of 12½ ft. by 12½ ft., which gave an intensity of about 6 foot-candles.

Some interesting cost comparisons have been worked out by A. C. Nielsen Co., who made an engineering survey on this installation. Briefly summarized, a 33 per cent larger lamp was employed, 66 per cent more fixtures installed, departmental lighting cost increased 108 per cent, and light intensity increased by 133 per cent.

The percentage of lighting cost to total payroll is significant—1.2 per cent in the case of the present lighting as compared with 0.6 per cent before. The difference of 0.6 per cent indicates how slight an increase in general labor efficiency is needed to compensate for added lighting cost.

The certainty of increased efficiency on all coordination of eye and hand may be inferred from the increase from 6 to 14 foot-candle intensity. The above figures only prove that light may be considered as a low cost tool, adding to operating expense a total of only $0.076 per employee per day in this case. B. E. M.





"We Find It the Best Way"

Twelve years' experience dictates this method of preparing small lead wires

How We Skin and Tin Our Leads

IN THE manufacture of our product we use many thousands of various size wire leads that have to have their ends skinned and tinned. We do the skinning by a commercial wire stripping machine on the larger size of wire, but the small No. 23 rubber-covered wire of 15 small strands gave us so much trouble with the breaking or cutting of the little wires that we were forced to adopt a method of skinning these by hand.

At first this may seem crude, but let me say from an experience of some 12 years that the simple little pair of side cutting cutters, with the blade of them filed down thin at the cutting edges and notched as shown in the sketch to just cut through the insulation, and not the wire, has proved the best and most economical. Our girls will cut off and skin both ends of a 100 leads for a rate of 11 cents per 100.

The leads are required to be tinned with solder after skinning. To clean the strands of wire bright and to remove the shreds of cotton threads and the sulphur of the rubber and the powder, etc., we buff the skinned leads, as shown in the sketch, a handful at a time on a wire brush wheel. This does a very satisfactory job at a rapid rate and gives a surface to the wires that makes tinning easy. C. H. W.

Everything Within Arm's Reach

PROFIT margins are so small in many a business that the sum of all the waste motions in a factory may make all the difference between profit and loss. An example, which while not involving a large number of employes still is typical, is on the shipping platforms of the Black & Decker Co. Here a caster-mounted pigeon-hole rack (see illustration at left) contains all the needed tags, labels, bills of lading, and so on. It is readily wheeled to the job, and there is no running after needed supplies. It might well be adopted in many another plant. H. C. K.

Saving the Drawings

TOO often original drawings in the design room get dog eared to the extent of requiring a redrafting. There is a simple machine on the market for treating drawings so as to postpone this evil day almost indefinitely.

It automatically folds a piece of adhesive edging paper in place, and at the same time lays a linen thread in the fold. The adhesive coating is prepared by an electric heating element. In this way an adhesive is prepared which will stick well to any sort of drawing material including tracing cloth.

The marginal band formed is about 3/16 in. wide and makes tracings and drawings lie flat. W. B. T.

Another Use for an Air Brush

IN ONE mid-western electrical manufacturing plant certain parts of the factory interior are painted with a cold water paint. When it comes time to repaint, the old coating must, of course, be removed. The labor of removing the old paint has been considerably reduced by using an air brush to spray hot water on the surface and then employing a sponge. Large areas are quickly and evenly wet down by this unique method. A. F.

Perhaps you too have worked out little cost-cutting plans which are of value. If so, turn them in for use in this idea-exchange—a feature appearing each month in ELECTRICAL MANUFACTURING under this heading, "Ready to Apply." Ideas which are accepted will be paid for at a liberal contribution rate.

THINKING IT OUT

WITH THE EDITOR

Avoid the Old Boat Rocking

IN Pullman smoking room, on convention floor, in individual offices, yes, even in the golf club locker room—wherever you are, start talking business conditions and the chances are ten to one that you will soon be around to a discussion of price cutting.

You may start out comparing volumes, but before you know it you are on the price-cutting evil. That's how important it is now, even as never before.

So much for the "talk" side of it. What are you going to *do* about it—you individually? Perhaps there is no better first step than to read the address of Clarence L. Collens before a recent meeting of NEMA.

This address appears in full beginning on page 37 of the issue you are now holding in your hands. But if you haven't time for a full reading, at least do yourselves the justice of glancing at six of the pledges expressed by Mr. Collens, which appear in bold-face type in the left column of that same page.

Conditions in the industry, along with all the others, are bad enough right now, as it is, without rocking the boat to the extent of insidious price cutting.

Quite independently several of those attending the meeting at which this able address of Mr. Collens was delivered were heard to remark, "The pity is that many of those who most need this advice are not present to hear it."

If you were not there, an opportunity awaits you on page 37. Turn to it now while it's on your mind.

What Better Tool Today!

THIS editorial is not for NEMA members. They don't need it, or ought not to, for as a body they stand for uniform cost accounting because they know that it leads to that satisfactory competition that can be expected only from the manufacturer who is correctly informed and uses his information not alone for his own gain but also for the good of the industry of which his company is a unit. Such use of this information is to the advantage of his customer as well.

Reduced to simplest terms, uniform accounting means the adherence by the members of an industry to the same fundamentals underlying financial record keeping, cost accounting, and the figuring of selling prices. Accountants tell us that there have been great and rapid changes in the technique of accounting. So important have been these changes that there is now, as heretofore, great disparity of practice even as between companies in the same industry and confronted with similar financial and operating conditions.

The uniform accounting movement points the way to better practices. Obviously, if the accountants of companies engaged in the same industry should examine into existing methods of accounting and select therefrom that method most practical in its application and most accurate in its results, it would be the part of wisdom for all to accept that method. This is the essence of the uniform accounting movement.

Manufacturers have sometimes looked askance at a proposal for the cooperative study of cost accounting methods. This is because, being aware of the critical attitude of the Department of Justice on any movement that savors of price fixing, they have felt they might be treading forbidden ground.

It is easy, however, to see the innocuous character of the present-day uniform accounting movement. Here is an activity of a cooperative character in which every member company of an industry can take part wholeheartedly and with advantage to itself.

In the first place, the giving up of information on accounting methods (neither cost figures nor selling prices need be discussed or revealed) is no loss to the imparting company. Nor is it solely a case of helping the other fellow.

This is not always fully realized. And where it isn't, it is sometimes because of that attitude which one man attributed to another in the expression, "He's *down* on everything he's not *up* on."

Obviously, if a competitor improves his accounting procedure, regardless of where he obtains the improvement, it is likely to result in better informed competition from that competitor.

A second potent reason for the movement lies in the field of the technique. Accountants have come to learn that accounting systems and cost-finding procedure must be tailor-made if they are to suit the needs of any single company.

By the same token each line of industry presents problems peculiar to itself. Uniform accounting for lines of industry concerns itself with the peculiarities of the line, but still leaves to the individual company the adaptation to suit local peculiarities. Thus, here lies the second opportunity: the development of standard practice for the industry.

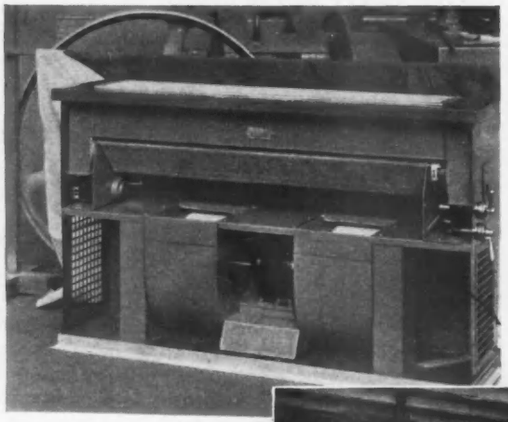
Reports of association conventions present recurring assertions that manufacturers in a given industry—it matters not which one—need a closer knowledge of costs. Why does this statement persist? Why is not something done about it? Fortunately the electrical manufacturing industry has sensed this need and is now committed to a program looking to the accomplishment of specific results.

But this is not a movement that should be confined solely to the members of NEMA. The movement will succeed only as the members of the electrical manufacturing industry, not alone the members of NEMA, accept the tenet that uniform accounting is good for the industry, and practice what they preach by cooperating in the movement to bring about uniformity of accounting. In short, it is a cooperative movement in the electrical industry that should have industry-wide support.

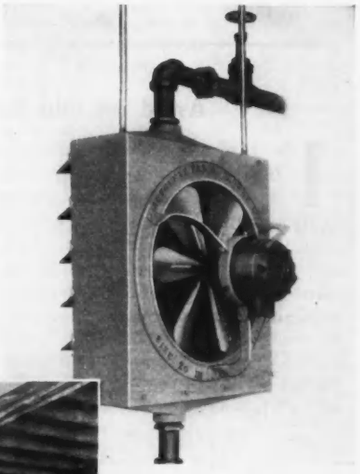
Leon J. Thomas

Editor

Here is a Market for Electric



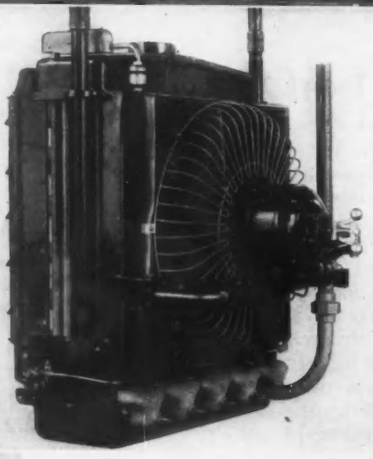
Below—Unit heaters of this type use motors ranging in size from ⅛ to 2 hp. Various types of motors are used, including A. C. single phase repulsion induction, A. C. polyphase induction, and D. C. shunt and compound. Either ball or sleeve bearings are used depending on the unit



Above—Sizes of motors for this unit range from 1/6 to 1 hp., and speeds range from 500 to 1150 r.p.m. A. C. and D. C. motors are used. Condenser motors on single phase, squirrel cage on polyphase, and series, shunt or compound on D. C.

Above—Built in various sizes, this unit uses motors ranging in size from 1/30 to 1 hp. Motors are A. C. or D. C. A. C. motors are split phase, condenser type operating on single phase current. D. C. motors are series type. Both sleeve and ball bearings are used

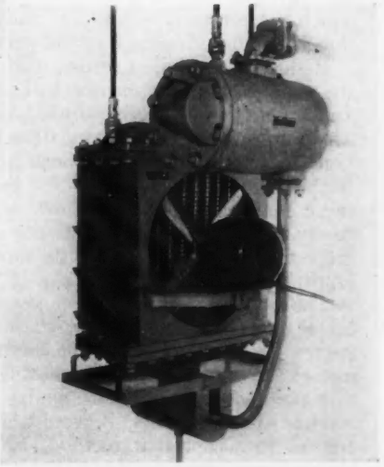
Right—This unit uses a 1/6 hp. induction motor. Sleeve type bearings are used. The motor is constant speed



Below—A unit cooler recently put on the market, designed to replace the conventional pipe coil system. A totally inclosed 1/25 hp. motor is used

UNIT HEATER

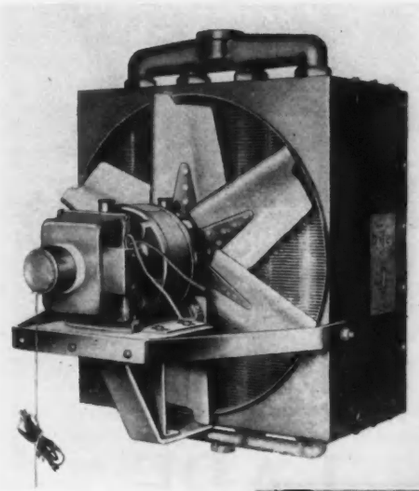
Left—This unit uses the following sizes of motors: 1/50, 1/40, 1/20, 1/10, ⅛, 1/6 and ½ hp. These are all induction motors equipped with sleeve bearings. Motors can be furnished either constant or variable speed



Motor and Control Equipment

Unit Heaters

Various types and sizes of unit heater motors illustrated on this and the opposite page are described in the accompanying captions

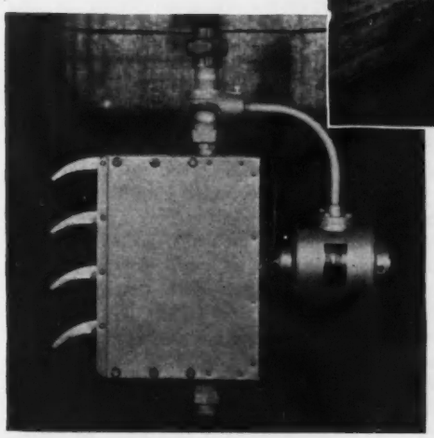


Above—Motors of 1/8, 1/6, and 1/3 hp. are used on this unit. D. C. motors are of the series and shunt types, and A. C. motors are of the condenser type. All bearings are ball type. Motors are all two-speed. The A. C. motors are constant speed at both speeds

Above—Motors range in size from 1/40 to ½ hp. Split phase, repulsion-induction and condenser motors are used on single phase. Polyphase motors are simple induction. D. C. motors are shunt or compound as desired

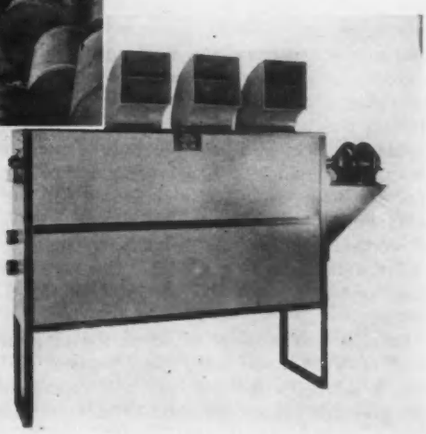
Right — (upper photo) — This unit uses motors ranging in size from 1/100 to ½ hp., and in speed from 850 to 1750 r.p.m. A. C. motors are induction, and D. C. motors are series and shunt. All motors use ball bearings. Standard motors are constant speed

Left—These units are 1/30, 1/20, 1/10, 1/6, and ½ hp. motors, designed with either sleeve or ball bearings. Motors are three-phase, split phase, and condenser types. Some motors are constant speed and some are variable

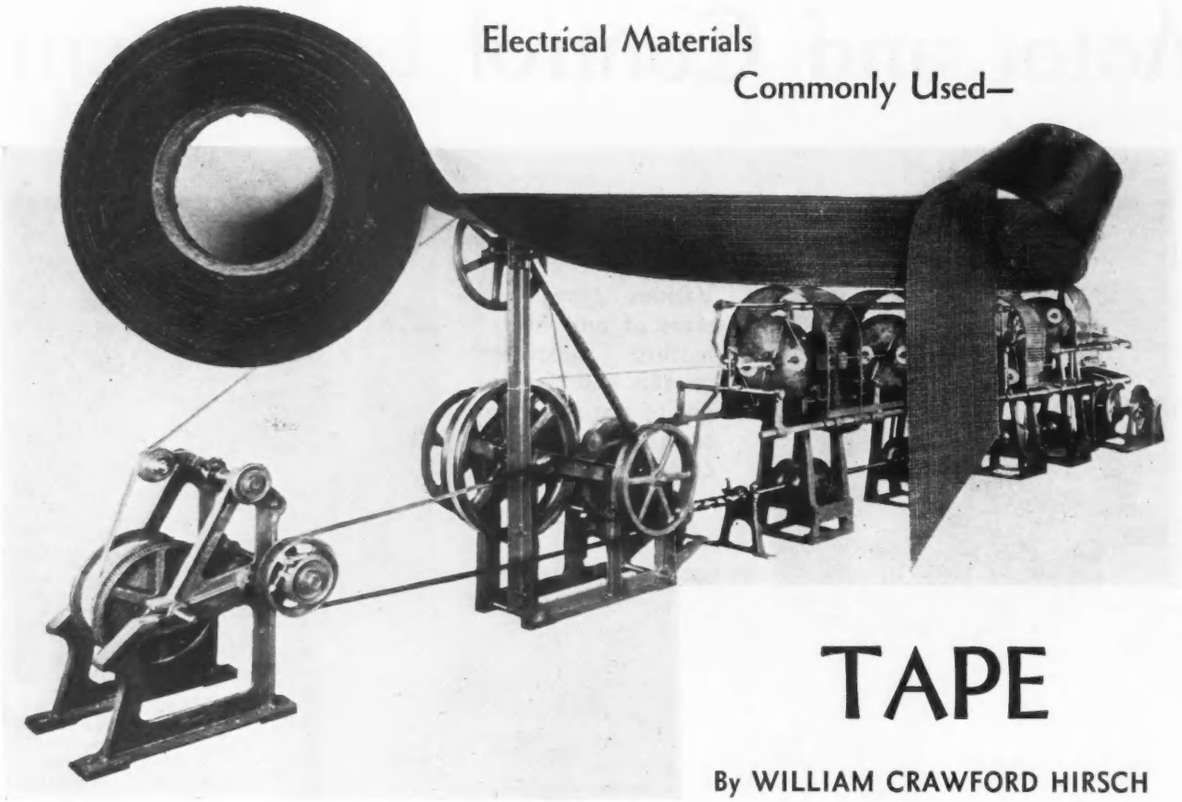


Left—Motors from 0.03 to 5/8 hp., all types. All motors use sleeve bearings

Right—Size range—1/20 to 7½ hp. D. C. shunt, and polyphase induction



Electrical Materials
Commonly Used—



TAPE

By WILLIAM CRAWFORD HIRSCH

Taping of wires is done by automatic taping machines such as this. In this machine two tapes are put on two separate wires and four tapes are put on the two wires converged

Tapes used in the electrical manufacturing industry may be classified according to their base materials into cotton, silk, paper, rubber and asbestos. Selection and application of each type of tape are discussed by the author.

TAPE is one of the outstanding forms of insulating materials used in electrical manufacturing. Where the contours of a part to be insulated, because of their irregularity and variableness, call for a pliable material, easy of application, tape of one sort or another is certain to come in for use. Flexibility is the one common property of all insulating tapes. In almost all other respects the different classes of tape differ widely from one another. As to base materials, tape may be divided into cotton, silk, paper, rubber, and asbestos. While some cotton and silk tapes are used in untreated form to tape generator and motor armature and field coils and transformer coils, cotton and silk serve primarily, and paper altogether so, as vehicles or supports for the actual insulating agents: linseed and other oils, asphalt compounds, mica, etc. The insulating efficiency of these impregnated or treated tapes depends nevertheless in a large measure upon the mechanical properties of the base materials. In the case of cotton and silk, this has led to exhaustive studies of the effect of certain weaves and finishes upon dielectric strength, and the manufacture of tape for electrical use may be said to have become a distinct specialty of the textile industry.

From a textile point of view, the classification of cloth tape resolves itself into tape woven as integral units with a selvage edge and tape slit from wide cloth which has previously been treated. The manufacturers of tape woven with fast edges on narrow looms point out that fraying of warp ends is precluded in their product, and that this is an important factor of safety. Those who manufacture tape from so-called varnished cambric cloth emphasize that by treating the cloth in the piece in specially designed tanks and under the strictest control of the thickness of the coating in the bath as well as in drying, they are able to obtain a highly uniform product. Most of this type of tape is now offered to the electrical manufacturer in bias-cut form. The untoward effect of sewed splices has been eliminated. Moreover, the manufacturers call attention to the ease with which "seamless bias" tape can be applied with taping machines, the possibility of air pockets caused by the coning effect, when straight-cut tape is used, being completely eliminated.

In years gone by linen had almost a monopoly of the high-grade electrical tape field. Cotton was thought objectionable, chiefly because of the starch used then in dressing cotton fabrics. Starch carbonizes under heat and might cause a short circuit between coils. The textile industry has overcome all of these difficulties. The so-called "Linen Finished" cotton tape that is being turned out by New England mills today is the equal, if not the superior, of the linen tape formerly in use. Thickness of the tape, while in the formative stage in the loom and during the finishing processes, is under closest control. Requirements generally exacted by electrical consumers are that the tape shall have a smooth finish, at least so on one side; that it shall be pressed to the thickness specified; and that

it be free from all objectionable impurities. In some uses bulk or thickness are not objectionable, being, in fact, required for certain purposes, and for these the tapes are not pressed. As a general proposition, it may be said that tape, woven as such, is not finished in the sense of being dressed, starched, sized or bleached, all of which processes might impair dielectric strength. They are the natural product of the loom, the finishing process consisting largely of eliminating what unevenness in thickness of surface is unavoidable during weaving. To prevent deviation from prescribed dimensions, to make tape a precision product, so that the taped coil will fit perfectly in the slot, the tape is calendered on special machines that compress the thick spots, fill the thin spots, and insure uniformity throughout. Obviously, the ability to absorb the impregnating compound with which it is later treated is one of the essential requisites in tape. Special tests to make certain of this property are made from time to time. The same holds true of the tensile strength of the tape.

"Selection of the right tape for a given purpose is largely a matter of individual engineering judgment plus experience. Data pertaining to dialectric properties serve more as approximate indications of the service that may be expected than as inflexible standards of value. Nothing can take the place of severe tests under service conditions."

Tape has come to be a highly inclusive term. As applied in the electrical industry, it embraces a number of products that from a textile point of view are not tape, as, for instance, webbing, a much heavier weave. Sleeving, intended for slipping over the leads of armature coils, is a tubular product, and does not come under the head of tape, but is generally grouped by manufacturers with tape in their catalogs. The range in thickness of tape proper is from 0.0045 to 0.007 in. The heavier grades of the webbing type, used chiefly where there are heavy mechanical stresses, are sometimes referred to as stay binding. Another variety of the heavier grade of tape is the so-called surgical tape, a herringbone weave with a tensile strength of approximately 100 pounds per inch width and used chiefly under banding wires on armatures and for taping and bracing large field coils.

Silk tape comes in for considerable use in finer windings. There are also tapes woven in part of cotton and in part of silk. Some of these fine, woven tapes are used in meter work.

Insulating tape cut from "varnished cambric" is not always tape in the sense of being narrow in width. Any width up to 35 in. is classified as tape. Moreover, although generally referred to as cambric, the base material is a cotton cloth, specially calendered or gaged as to thickness and woven in accordance with rigid specifications, but not necessarily a cambric. Duck and kindred cotton cloth come in for wide utilization. "Varnished," which implies in the common usage of the term a surface application rather than saturation, fails to adequately describe the process through which the cloth goes in order to fit it for arduous insulating duty. The cloth is submerged in special oil or asphaltum solutions from three to as high as seven or eight times, depending upon the ultimate use to which the tape is to be put. After each bath, the cloth is dried and each coat virtually baked on to its predecessor. The thickness of the insulation is minutely controlled after every operation, so that the final product will correspond to the most exacting specifications. Air-pockets and similar defects are especially guarded against. With all of its dilgence-involving steps, the process has been highly mechanized, so that the procedure is virtually automatic, "fool-proof" and economical. The slitting of the cloth into tape has also been brought to a high standard of precision. Bias-cut tape is made by cutting the cloth into strips at an angle of 45 degrees, yielding diamond-shape strips. These pieces are joined in such a manner that there is no lap. Seamless bias tape is a relatively recent development, the straight tape continuing to be used by the side of the seamless kind.

The black tape, treated with asphaltum compound, is designed to withstand high temperatures and high electrical stresses, as, for instance, in high tension and transmission equipment. For different applications it is marketed with a slightly tacky, dry or greasy finish. The yellow tape, used largely in the taping of coils, is impregnated with linseed oil or sometimes with a mixture of linseed and other oils. Just now the linseed oil market is very favorable to buyers, but in the past there have been periods during which almost prohibitive prices prevailed. The yellow or tan-colored tape is finished slightly tacky, dry and waxy.

"Varnished" cloth tape is used in motors, generators and transformers; taping up leads and terminals; wrapping joints of all sorts; as a friction tape on high-voltage apparatus, etc. In the taping of coils, both the tape, woven as such, and that cut from insulating cloth find employment, the two descriptions of tape being more or less competitive in all applications.

Nearly all oils are possessed of high resistivity and good dielectric strength. Linseed oil, however, is an especially valuable insulating medium because, when exposed to the air in a thin film, linseed oil gradually absorbs oxygen, ultimately yielding a solid elastic mass known as linoxyn.

A machine for taping generator and motor field coils. Machines are available for doing almost all types of production taping jobs

This oxidation product is highly resistant. It is because of this property that linseed oil gives to tape a firm, thick film surface which acts as a shield against moisture and as a resistant to abrasion.

Selection of the right tape for a given purpose is largely a matter of individual engineering judgment plus experience. Data pertaining to dielectric properties, usually consisting of puncture voltage for a given thickness, serve more as approximate indications of the service that may be expected than as inflexible standards of value. The only absolutely dependable criterion consists of a sufficiently

comprehensive series of tests under actual service conditions.

So-called friction tape serves chiefly to provide mechanical as well as electrical protection to wires. Where low voltages are involved, the friction tape, which is impregnated with a rubber-containing compound to make it adhesive, furnishes adequate insulation. On conductors carrying higher voltages, the friction tape is used not so much to furnish insulation as to protect the inner wrappings of treated material to which the duty of insulation is principally assigned. In addition to its use in the insulation of wires and cables, a good deal of friction tape serves in taping joints of electrical apparatus, wrapping of armatures and taping of all sorts of leads.

Besides friction tape there are rubber, armature, mica and oil-impregnated paper tape. The latter is used in the manufacture of paper-insulated cable.

A special grade of tape has a rubber surface on one side and a fabric friction surface on the other. Rubber splicing tape or splicing compound consists either of cloth coated with pure india rubber, uncured and unvulcanized, or of an all-rubber compound without any other ingredients. There are also splicing tapes made of waterproof and acid-resisting compounds into which rubber does not enter. The principal use for the almost endless variety of products known as splicing tape or splicing compounds is in the insulation of wire and cable, but there is also an important volume of consumption of these materials in the manufacture of high-voltage machinery, generators, motors, transformers, etc. A good many specialties are included in the classification of splicing tape. There is a rubber tape which under ordinary pressure of the hand is converted into a solid insulating wall. This tape has some time been referred to as "self-vulcanizing," which is a rather misleading description.

Armature tape is the designation usually given to a white tape, woven as such with a fast edge or slit from cotton cloth, and lightly frictioned on one side. It is treated with a white, adhesive rubber compound and chiefly used for winding coils, its relatively slight stickiness preventing the slipping or uncoiling of the tape.

Mica tape or mica paper tape consists of layers of mica splittings, supported by suitable insulating paper, the whole being carefully built up into a uniform, composite insulator. Mica paper tape finds wide application for insulating closed coils and for sharp bends on large and small coils. The tendency toward strap-wound and bar-wound armatures, running at high temperatures, has increased its sphere of utilization. Thickness ranges from 0.004 to 0.007 in. and for these dielectric strengths of 2500 to approximately twice that voltage per mil are obtained. The paper used is a strong Japanese. In use, the mica splittings have a tendency to unite more closely with one another, so that insulations, following many years of strenuous use, have shown the Japan paper completely worn away, but the mica forming as solid a ribbon unsupported as it did while reinforced by the paper.

Large quantities of oil-impregnated paper tape are used in the manufacture of paper-insulated cable. Different compounds are used in treating paper tape, careful vacuum drying being one of the features of the process.

Asbestos tapes are woven of that mineral fiber, ranging in thickness from 0.015 to 0.025 in. and in widths from ½ to 1½ in. The tape is marketed, as a rule, in 21-yard rolls. It is selvedged and the product of long-fiber asbestos, free from all iron. Wherever high temperatures must be met and inflammation prevented, asbestos tape comes into use. Its chief application is in the insulating of coils calling for fireproof construction. So-called fine asbestos listing tape is used for winding armatures, field coils, and for insulating the conductors of large turbo-alternators. A good deal of this material goes into the construction of electrical railway equipment, electric locomotives and the controlling devices connected with them calling for considerable quantities of asbestos listing.

Impressive progress has been made in machines for applying insulating tape around the conductors forming armature, transformer and kindred coils. The general principle of coil-taping machines consists of a bobbin, on which is the tape and which rotates on a split-guide ring, passing in and out of the coil at each revolution. Uniform tension of the mechanism insures uniform taping. These machines have greatly reduced the cost of coil taping and at the same time improved the workmanship immeasurably. Different designs for winding different types of coils have been developed by builders of these machines, some of the taping machines being fully automatic.

In the same manner, highly efficient machines have been developed for taping wire, multiple operation permitting the taping of as many as six lines of wire simultaneously. Some of these machines are so ingeniously designed as to permit of putting two tapes on one wire, two tapes on a second wire, the two wires then converging in the mechanism and four tapes being applied to them.

Colored Liner Makes Display Boxes Out of Shipping Containers

A colored liner designed to make display boxes out of corrugated containers is now available in all the colors of the rainbow. Myracol is the name of the material, manufactured by the Container Corporation of America. By the use of the material it is suggested that the name of the product and the manufacturer's name can be worked out in a more distinctive manner to agree with the predominating color of the box. The use of boxes of Myracol in window displays is also suggested. Attention is also called to the point that they will attract attention on trucks, sidewalks and shipping platforms. Even the tape is in a color that will match the color of the box.

The manufacturer makes the point that on the shelves of a warehouse, jobber or retailer, the many different colors of packages will be a help in the quick identification of the various goods of manufacturers.

Radio Principle Used to Create Artificial Fever—Kill Germs

More than 100 doctors attended the meeting of the New York Physical Therapy Society held recently at the New York Academy of Medicine, to discuss publicly for the first time the result of experiments in a new physical method of treating disease. This method consists of synthetically stimulating heat by a machine which is essentially a small radio sending station in order to create in the body an unfavorable environment for various germs and parasites that cause disease as well as to stimulate all the chemical processes concerned with the body's defense against invaders.

Dr. Charles M. Carpenter of the Department of Radiology, Rochester University described an experiment in which rabbits were inoculated with germs which cause general paralysis. Twenty-six of these animals were treated with this machine. The other animals were not treated. Doctor Carpenter said that 90 per cent of those treated failed to develop the disease.

WHAT'S NEMA DOING?

A department covering activities of the divisions, committees and sections of the National Electrical Manufacturers Association

Annual Meeting at Old Point Comfort

AT the association's annual fall convention, which was held in the Chamberlin-Vanderbilt Hotel at Old Point Comfort, Va., October 19 to 23, Clarence L. Collens, president of the Reliance Electric and Engineering Company, was re-elected president of the organization.

The James H. McGraw Award for Electrical Men, consisting of the "Manufacturers Medal" and a purse of $100, was bestowed upon L. F. Adams, for his accomplishments in standardization work during past years, and R. W. E. Moore, for his achievements in connection with activities dealing with fire and casualty hazards. Addresses were delivered by President Collens and Dr. Virgil Jordan. Taking as the title of his talk "Restraint in Business," Mr. Collens spoke of the need for self-control in setting and following business policies, while Dr. Jordan gave a picture of present and recent economic and business conditions under the topic "The Business Situation: A Challenge to Business Statesmanship."

To assist in the organization of a national association of maintenance engineers, the Board of Governors selected three representatives to act as members of a planning committee now being formed by the sponsors of the movement.

It was decided to hold the spring meeting of NEMA at Hot Springs, Va.

The following is a complete list of association officers elected: President—Clarence L. Collens; treasurer—R. H. Goodwillie; vice-presidents (seniority determined by lot)—F. R. Fishback*, C. H. Strawbridge, S. L. Nicholson, D. R. Bullen and W. E. Sprackling; executive committee—Clarence L. Collens, president; R. H. Goodwillie, treasurer; C. A. Bates*, I. A. Bennett, Wylie Brown*, D. R. Bullen, H. B. Crouse, F. R. Fishback, A. L. Lindemann*, H. J. Mauger, D. H. Murphy, S. L. Nicholson, Louis Ruthenburg*, W. E. Sprackling and C. H. Strawbridge; board of governors (consists of executive committee plus the following)—Louis Allis, F. A. Merrick, L. C. Nichols*, W. D. Steele*, L. G. Sylvester*, G. A. Waters* and F. T. Wheeler*; managing director—Arthur W. Berresford; counsel—Francis E. Neagle. (The asterisk means newly elected to office shown.)

NEMA-N. E. L. A. Joint Committee to Discuss Motor Starting Currents

A JOINT committee of NEMA and N. E. L. A. has been authorized to discuss motor starting currents. The committee will deal with general purpose motors and will discuss possible revision of former rules such as the 1923 rules of the Electrical Apparatus Committee of N. E. L. A. The NEMA representatives are T. E. Barnum (Cutler-Hammer, Inc.) of the Industrial Control Section, and L. F. Adams (General Electric Co.), R. W. Owens (Westinghouse Elec. & Mfg. Co.) and G. A. Waters (Wagner Electric Corp.) of the Motor and Generator Section. The N. E. L. A. representatives are L. L. Elden (Edison Electric Illuminating Co. of Boston) and L. R. Bonnett (Brooklyn Edison Co.), of the Electrical Apparatus Committee.

Joint Committee Appointed on Multi-Speed Stator Connections

THE Standards Committee has appointed the following representatives to serve on a joint sections committee on standards for multi-speed stator connections and terminal markings: E. P. Allis (Louis Allis Co.) for Motor & Generator Section, and T. D. Montgomery (Cutler-Hammer, Inc.) for Industrial Control Section.

Joint NEMA-N. E. L. A. Body to Study High Tension Porcelain

A JOINT NEMA-N. E. L. A. Committee on high tension porcelain standardization has been appointed with H. H. Rudd (Railway & Industrial Engineering Co.) and H. E. Ruggles (Westinghouse Elec. & Mfg. Co.) (alternate) as NEMA representatives and R. W. Wilbraham (United Engineers and Constructors, Inc.) and Alexander Maxwell (N. E. L. A. Headquarters) (alternate) as N. E. L. A. representatives. This committee will study the possibility of standardizing insulating porcelain used in stations as distinguished from line insulation which is already being handled by a sectional committee of American Standards Association.

Radio and Telephone Interference Will Be Studied by Sub-Committee

A SUB-COMMITTEE on radio and telephone interference such as might be produced by contactors, commutators, etc., has been authorized by the Standards Committee consisting of the following individuals: L. T. Robinson, chairman (General Electric Co.), J. J. Smith, secretary (General Electric Co.), L. W. Chubb, R. D. Evans and F. C. Hanker (Westinghouse Elec. & Mfg. Co.), R. H. Manson (Stromberg-Carlson Co.), H. R. Summerhayes (General Electric Co.) and R. B. Williamson (Allis-Chalmers Mfg. Co.). Both Mr. Allis and Mr. Montgomery have spent a major part of their time during recent years in this field.

NEMA Issues New Book on Motor and Generator Standards

A NEW book of motor and generator standards has just been published by the National Electrical Manufacturers Association. This book is a valuable reference work of practical information on the manufacture, test, performance and application of alternating and direct current motors and generators, frequency converters and motor-generator sets of small and large power capacities.

The volume contains over 550 rules dealing with rating, performance, manufacturing, application and commercial considerations. It also contains a large section devoted to the definitions of electrical terms and abbreviations met with in the motor and generator industry.

It contains the information mentioned above as applied to the following apparatus: Small and large power motors, (both a-c and d-c), elevator motors, crane motors, a-c and d-c engine driven generators, frequency converters and motors above 60 cycles for industrial purposes, synchronous motor-generator sets of 200 kw. and larger, and farm lighting plants.

Much of the material is entirely new including ratings for large power d-c motors and elevator motors, minimum efficiencies and indicated starting currents for fractional horsepower motors, ratings and specification forms for a-c generators, definitions for squirrel-cage and other motors and the Department of Commerce simplified practice recommendations on carbon brush sizes. Four entirely new sections have been added.

A large number of tables have been added for the first time covering standard horsepower and speed ratings and standard compressor applications and factors for large direct driving synchronous motors.

An entire section is devoted to the standard method of connections and marking of terminals for the various types of motors and generators covered by the book.

The book is 8 by 10½ in. in size and has 132 pages and is bound in usual NEMA brown linen covers. It may be obtained from the National Electrical Manufacturers Association, 420 Lexington Ave., New York, N. Y., at $1.50 per copy.

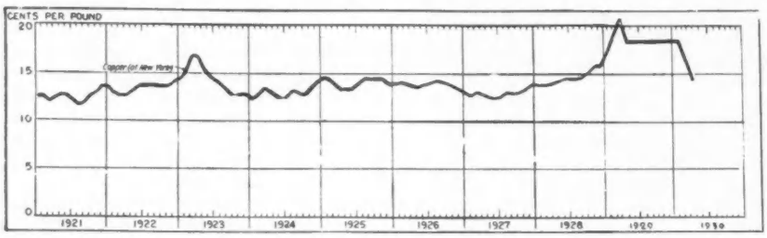
Adams Chosen to Head C. & F. P. Committee

L. F. ADAMS has just been appointed chairman of the Casualty and Fire Prevention Committee of NEMA. For three years previous he was chairman of the Association's Standards Committee, and he has been in such activities for many years in the former Electric Power Club. He is commercial engineer of the General Electric Co.

Facts, Figures and Trends

What's Happening to Copper, and What of It?

It is human nature to be poignantly conscious of what is happening right now. That is why so many electrical eyes are grim over the copper market. Copper prices have been falling very rapidly. For a year the base price of copper was 18 cents. Overnight (April 13-14) it dropped to 14 cents, a fall of 22 per cent. Looks bad. But not so bad when the history of the copper market for the past ten years is reviewed. Look at the chart. Copper has been lower than 14 cents many times in the past ten years. What is happening now doesn't look much different from what happened back in 1923. Copper prices are not the only prices that have been falling this year. But copper will soon rise again, the chances are, and in the light of history "chances" are pretty reliable.



What the Public Wants in Radio

In a recent survey covering 44 retailers in the radio business throughout the United States, it was found that price was the prime consideration in determining the purchase of a radio set. Of the 44 dealers answering the questionnaire, 21 gave price first importance, 7 stated that the tone quality was the primary consideration, while 5 placed appearance in first place.

Thirty-eight of the stores reported sales of both battery and electric sets. Two of these stores reported a larger sale of battery sets than of electric sets, one store reported a similar number of each type, while the remaining 35 stores gave the preponderance of sales to electric sets. The average for the 38 stores reporting sales of both types stood at 6.3 electric sets per battery set.

Radio Sales in the Second Quarter Estimated at $87,000,000

Sales of radio equipment by retail dealers during the second quarter of 1930 totaled $87,000,000, as compared with $92,000,000 during the corresponding period of 1929, according to the estimate of the Electrical Division, Department of Commerce, obtained by applying to the total number of known radio dealers the data submitted in 6,535 reports. The average business per dealer reporting was $2,015, as compared with $2,350 for the second quarter of last year.

The total sales of radio equipment for the first six months of 1930 are estimated as in excess of sales in the corresponding period last year, $231,000,000, as compared with $224,000,000. If average sales, allowing for seasonal variations, are maintained during the year, it is estimated that total sales by all dealers for the twelve months will approximate $645,000,000.

Italian Power Output First Half of 1930

In the first six months of 1930, the total amount of current generated in Italy or imported (to a relatively slight extent across some points on the Swiss border) amounted to 4,896,496,000 kw.-hr., an increase of 213,298,000 kw.-hr., or 4.55 per cent, over the corresponding six months' total for the preceding year. The growth was entirely due to the larger half year's output of hydroelectric current.

Power generated with fuel and imported current, declined materially. In the six months' period of 1930 the fuel generated current amounted to 123,943,000 kw.-hr., against 204,224,000 kw.-hr. in the first half of 1929. Imported current during the six months' period fell from 120,506,000 to 85,770,000 kw.-hr.—(Assistant Commercial Attache A. A. Osborne, Rome, Italy, Aug. 15, 1930.)

Wholesale Prices Remain Stationary

Commodity prices reported upon by the United States Bureau of Labor Statistics showed an index of 84 for August, which is precisely the same as that for July. Thus, the steady decline which has been under way without interruption since July, 1929, appears to have been arrested. The index in August, 1929, was 97.7, while in July, 1929, it was 98. These were the two highest months since September, 1928. The index is expected to rise steadily.

Industry Is Reclaiming Old Materials

An increasing amount of reclaimed copper has played an important part in the recent decline in the copper market. Production of primary copper in the United States in 1928 was 935,000 tons. During this same period about 625,000 tons of copper and its alloys were reclaimed.

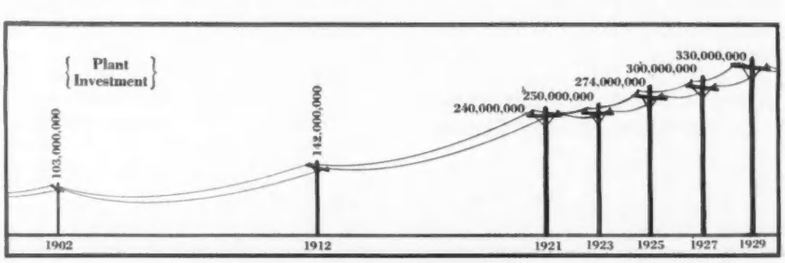
Lead from old battery grids offers another good example of reclamation. Recovery of lead from old battery grids supplied 62 per cent of the 210,000 tons required by battery manufacturers in 1928.

During 1928 the value of non-ferrous metals recovered in the United States was nearly $278,000,000, an increase of $21,000,000 over the previous year. Most of the larger metal-working concerns now make definite efforts to utilize, reclaim or salvage all scrap resulting from their manufacturing operations.

With increasing attention being given to salvaging, it seems likely that scrap from even the smallest concerns can go back into the market.

"Don't Write—Telegraph"

Telegraph companies did a record business in 1929 with gross revenues estimated at 170 million dollars. It was in 1844 that F. B. Morse invented the telegraph and sent his historic message from Baltimore to Washington: "What hath God wrought."



Growth of United States Telegraph Companies

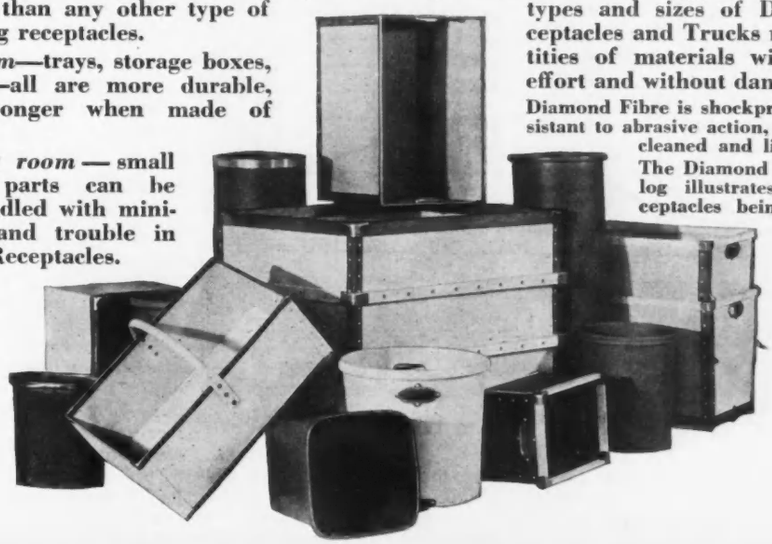
Protection

when carrying your production from raw materials to shipping room

Diamond Fibre Receptacles are more readily adaptable to handling parts and products of every conceivable nature, than any other type of material handling receptacles.

***In the stock room*—trays, storage boxes, barrels, trucks—all are more durable, lighter and stronger when made of Diamond Fibre.**

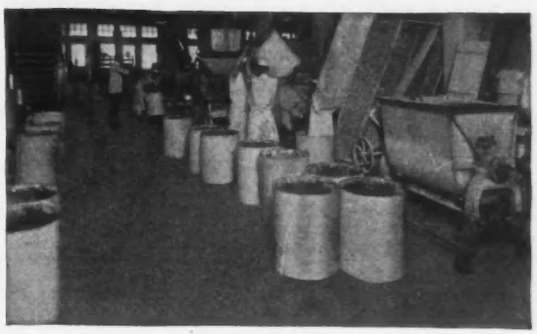
***In the shipping room*— small packages and parts can be stacked and handled with minimum expense and trouble in Diamond Fibre Receptacles.**



***In the production aisles*—from department to department, to the shipping room, innumerable types and sizes of Diamond Fibre Receptacles and Trucks move greater quantities of materials with less noise, less effort and without damage to product.**

Diamond Fibre is shockproof, strong, highly resistant to abrasive action, non-splintering, easily cleaned and light in weight.

The Diamond Fibre Receptacle catalog illustrates many types of receptacles being used in over five-hundred industries. Send for your copy today!



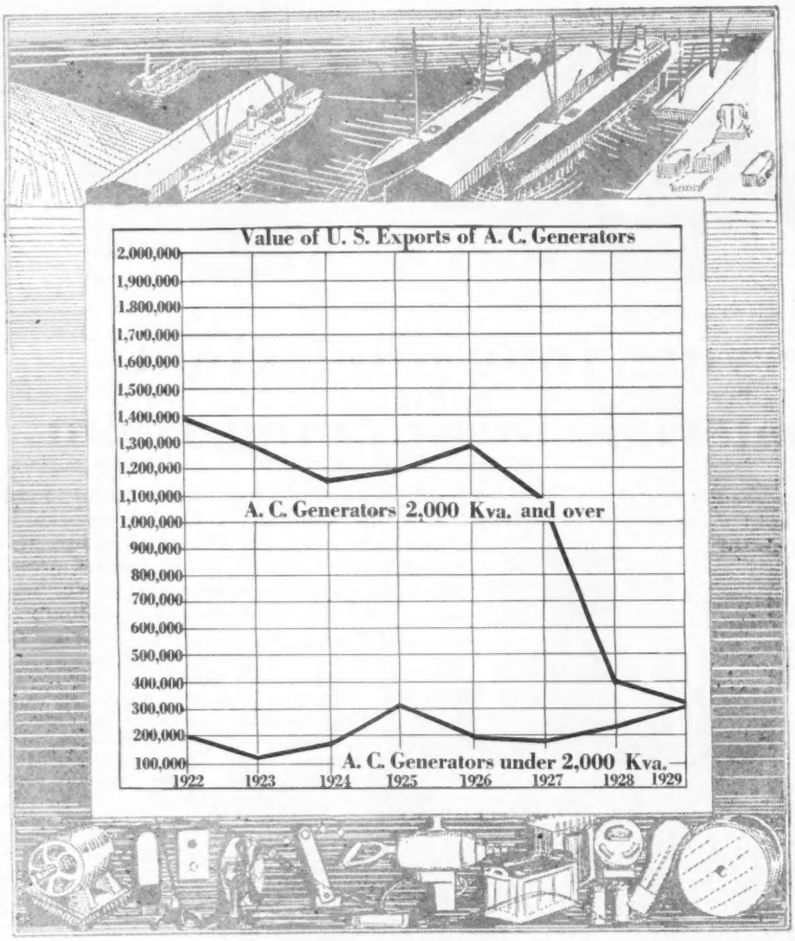
CONTINENTAL-DIAMOND FIBRE COMPANY

Manufacturers of Dilecto—Diamond Fibre—Celoron—Micabond

NEWARK, DELAWARE

BOSTON, MASS.
NEW YORK, N. Y.
CLEVELAND, OHIO
CHICAGO, ILL.
SAN FRANCISCO, CALIF.
TORONTO, CANADA
KANSAS CITY, MO.
MILWAUKEE, WIS.
SPARTANBURG, S. C.
PHILADELPHIA, PA.
ST. LOUIS, MO.
WASHINGTON, D. C.
DETROIT, MICH.
NEW ORLEANS, LA.
INDIANAPOLIS, IND.
MINNEAPOLIS, MINN
BIRMINGHAM, ALA.
SPOKANE, WASH.
VANCOUVER, B. C. CAN.
MONTREAL, CANADA
LOS ANGELES, CALIF.
SEATTLE, WASH.
PORTLAND, OREGON
BRIDGEPORT, PENNA.
WINNIPEG, MAN.
VALPARAISO, IND.

In Canada: DIAMOND STATE FIBRE CO. OF CANADA, LTD., 350 Eastern Avenue, Toronto



A.C. Generator Exports, 1922 to 1930

According to figures published by the United States Department of Commerce, exports of large A. C. generators have declined fairly steadily since 1922, amounting to nearly a million and a half dollars in that year and only a little more than 300 thousand dollars in 1929. Likewise, A. C. generators of 2000 Kva and under have increased in export from 200 thousand dollars in 1922 to a little more than 300 thousand dollars in 1929. The curve at the bottom of this page shows where the majority of this class of equipment is sold in foreign markets.

Those contemplating the export of A.C. generators should carefully investigate the commercial voltages and frequencies of the countries in question, because these factors are not nearly so standardized in foreign countries as they are in the United States. The entire line of one manufacturer was changed to cope with foreign conditions.

Up, Down, Up—the Way of Business

During the past forty years about a dozen noteworthy business recessions have occurred. The shortest recession began in 1907 and lasted for only eight months. The longest recession began in 1912 and lasted for twenty-five months. This recession, however, may be left out of consideration because it was abnormally prolonged by the outbreak of the World War. The second longest recession began in 1910 and lasted sixteen months. The average length of these various recessions, excluding the one which began in 1912, was twelve months.

Length of Business Recessions

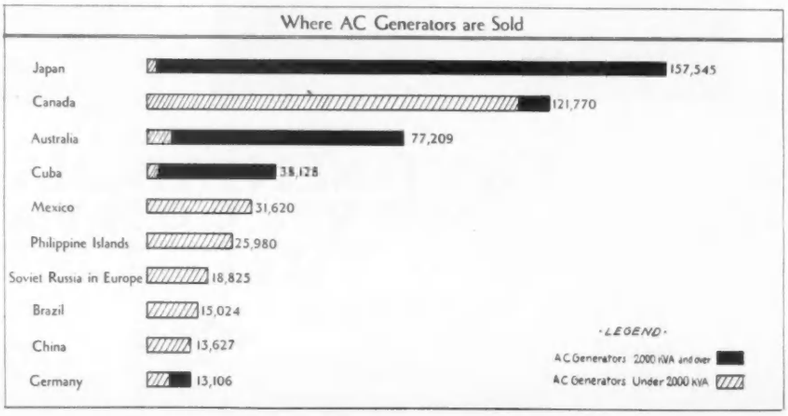
Year Starting	Length
1893	15 months
1895	13 months
1899	12 months
1903	13 months
1907	8 months
1910	16 months
1912	25 months
1917	8 months
1919	12 months
1924	14 months
1927	9 months
1929	? months

The present outlook is that the length of the current business recession will not greatly exceed the average length of previous recessions.

However, the fact that business promises to begin a recovery in the near future should not be taken to mean immediate prosperity. The rise from the present level of depression to generally satisfactory conditions is likely to require a considerable time. The recovery which followed the recession beginning in 1893 was in progress 13 months before business attained a normal volume. After the recession of 1907 business required 15 months for recovery. Following the recession which began in 1919, business needed 19 months to reach a normal level. The current recession, however, seems to resemble the major recessions beginning in 1893, 1907 and 1919 more than the other recessions. It is probable, therefore, that when the revival sets in, it will not progress particularly rapidly.—*Business Conditions Weekly.*

Ten Leading Export Countries for A.C. Generators

The accompanying chart was compiled from figures for 1929 furnished by the Department of Commerce. This chart shows many surprising things, for instance, that we export the most of large A.C. generators to the same country to which we export the least small ones—Japan. Notice that this condition is almost reversed in Canada. Notice the importance of Mexico as a market for A.C. generators under 2000 Kva., and see how far down the column Germany comes. The history of A.C. generator exports over a period of years is given in the other chart on this page.



AMBLER COLD MOULDED

ASBESTOS

may be the answer to your production problems. It has settled hundreds of perplexities for electrical manufacturers. May we demonstrate to you how Ambler will fit into your production?

Write for free catalog on "Ambler Asbestos Products for the Electrical Industry"

The Ambler Asbestos Line Includes:

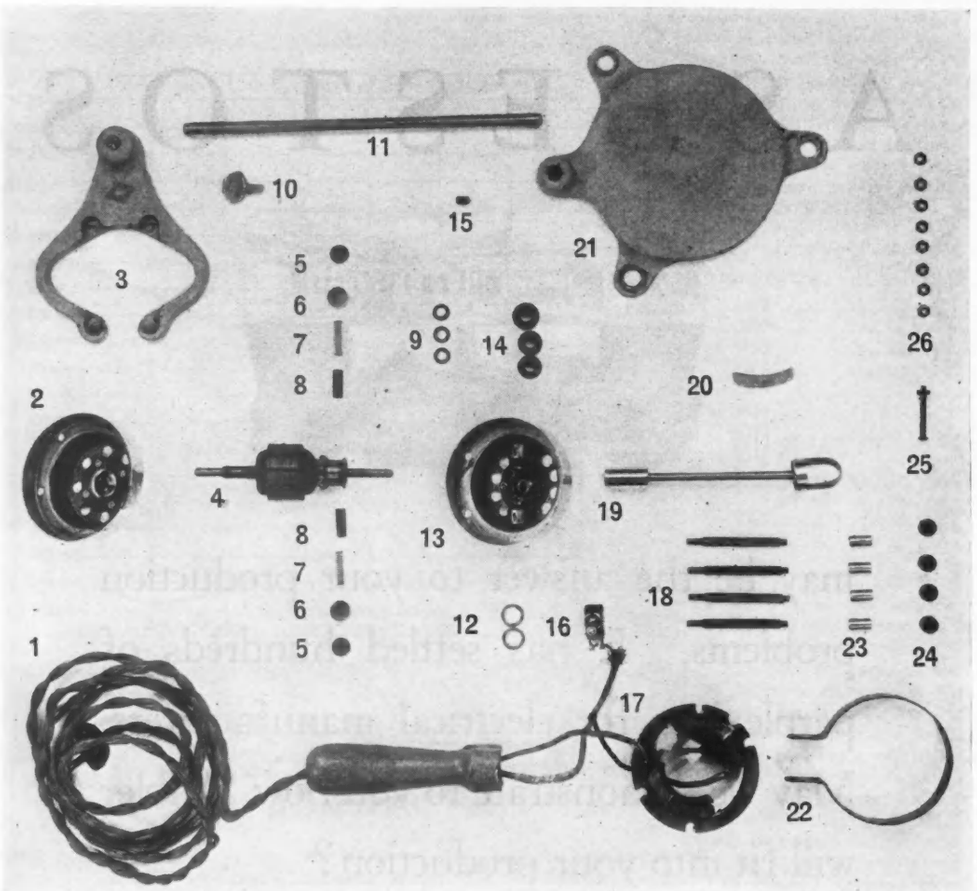
Fireproof Asbestos Shingles
Asbestos Corrugated Roofing and Siding
Ebonized Asbestos for Switchboards and Panels
Linabestos Wallboard
Asbestos Lumber
"Waltile" for decorative Wainscoting

AMBLER ASBESTOS SHINGLE & SHEATHING CO.

Ambler, Penna.

St. Louis Mo.

What Is It Made of?



A Small Kitchen Mixer

Table of Parts and Raw Materials Used

No.	Part Name	Material	No.	Part Name	Material
1	Cord Set	Insulated wire and plug	14	Base feet	Rubber
2	Motor housing	Stamped steel	15	Base set screw	Steel
3	Mixer rest	Cast iron	16	Starting switch	Steel, fiber, copper
4	Motor armature	Steel, wire, copper	17	Motor field	Steel, copper, insulation
5	Brush holder disk	Fiber	18	Motor bolts	Steel
6	Brush holder cover	Stamped steel	19	Stir	Steel
7	Brush holder spring	Steel	20	Name plate	Stamped steel
8	Brush	Carbon	21	Mixer base	Cast iron
9	Armature washers	Fiber	22	Handle ring	Stamped steel
10	Mixer holder thumb screw	Steel	23	Spacers	Steel
11	Column support	Steel	24	Mixer feet	Soft rubber
12	Starting switch nuts	Steel	25	Handle nut and bolt	Steel
13	Motor housing	Stamped steel	26	Nuts	Steel

An unusual feature of this small kitchen mixer is the motor construction. The housings are stamped and the bearings attached so as to be self-aligning. The commutator consists of copper bars attached to two fiber disks. Even the brush holder is stamped

If you make ELECTRONIC TUBES

or if you plan to make them . . . read these facts about DUREZ!

NO MANUFACTURER of radio bases and parts, no concern which plans to make electronic apparatus and devices, no person who is following closely the new and diverse applications of the electronic tube, can afford to overlook Durez, the perfect molding compound!

For years, Durez has been used successfully in millions of pieces of radio equipment. Tube bases and sockets . . . panels and condenser sets . . . variometers and dials . . . all have worked more silently, smoothly, efficiently with the help of Durez. Now, with chemists and physicists daily uncovering new applications and uses for the revolutionary electronic tube, the possibilities for Durez in this field are greater than they have ever been before!

Durez goes to the molder in powdery, dust-like form. Tremendous pressure is applied. In a matter of seconds, the part comes from the mold, *finished!*

Parts made from Durez are strong, tough, light

Resistant to acids, moisture, gases, perspiration. Tube bases hold their shape. The high mechanical strength of this amazing material makes very thin sections possible, permitting the extensive use of holes, slots and metal inserts — all cared for in the one molding operation! . . . Durez will not cold-flow.

Although tooling, polishing and burnishing are unnecessary, the finish on Durez molded parts is always smooth and even. You can choose from a wide variety of beautiful colors. . . . Each Durez-molded piece is an exact duplication of every other! Precision can be held within closest commercial limits, resulting in definite savings on machining operations.

Let us tell you more about Durez

Durez is continually replacing wood, metal, porcelain, ivory, hard rubber and other materials. Let us show you how it can make *your* product better, more efficient, more durable. Our engineering staff is ready to give you full information on the practicability of using this extraordinary raw material in your business, or in making something you use. *Write for free booklet to General Plastics, Inc., 119 E. Walck Rd., N. Tonawanda, N. Y. Also New York, Chicago, San Francisco, Los Angeles.*

THE MAKERS OF DUREZ ARE ALSO THE MAKERS OF DUREZ INSULATING VARNISH

Electrical Manufacturing News

Many New Devices to Feature Coming Power Show

Details of the Ninth National Exposition of Power and Mechanical Engineering, to be held Dec. 1 to 6 in Grand Central Palace, New York City, are well-nigh completed, according to I. E. Moultrop, chairman. A larger attendance than ever is expected. The advisory committee, which has been active in making arrangements for the show, is composed of Homer Adams, N. A. Carle, H. D. Edwards, Fred Feldeman, V. M. Frost, L. A. Harding, C. F. Hirshfield, O. P. Hood, J. H. Lawrence, F. R. Low, D. M. Myers, F. W. Payne, Charles Piez, J. W. Roe and Charles F. Roth.

Many new devices will be exhibited, as well as modifications and improvements of old ones. Among the interesting electrical devices is a thermostatic device which operates on a variation of one-tenth of a degree. This thermo regulator will operate from the warmth of the hand, and may be applied to industrial uses wherever a close control of temperatures is desirable. Another exhibit will feature a substance that looks like sheep's wool, but actually is a mineral product that resists heat and will not burn or disintegrate. It is used in all forms of insulation for all types of heating appliances. A third device of particular interest to be shown is a new valve that works entirely on a pre-setting of the valve according to the temperature desired at the particular point, and is looked upon as a possible solution of the problem of uniform heat throughout the building, without waste.

A large contribution to the attendance at the Exposition is expected to come from the American Society of Mechanical Engineers, which will meet at the same time that the National Power Show is in progress.

DeForest Radio Increases Facilities

Announcement has been made of the acquisition by the DeForest Radio Co. of 15,000 sq. ft. of additional floor space adjoining its factory at Passaic, N. J., according to William J. Barkley of that organization. The new floor space is to be used to enlarge the experimental laboratories, in which research will be carried on as to the behavior of tubes in transmitters, receivers and televisors. New uses are continually being found, particularly in the television field and in conjunction with the photo-electric cell.

Test radiovision programs at this time are being transmitted nightly, except Saturdays and Sundays, from 8 to 10 p. m., Eastern Standard Time, by Station W2XCD of the DeForest company. The signals, transmitted on 2065 kilocycles, are of the standard 48-line, 15 pictures per second category.

Anaconda Men Gather for Sales Conference

Salesmen and sales engineers for the fourteen district offices of the Anaconda Wire & Cable Co. met at a sales conference held in New York City Sept. 7, 8 and 9. The controlling factor of the conference was the fact that Anaconda Wire & Cable Co. operates twelve mills, from the Atlantic to the Pacific, and makes 65 different products.

Bottom Row, Left to Right

H. B. Dwenger....manager, bare and weatherproof wire sales
F. W. Brower.....assistant sales manager, New York
D. A. Gubbins....assistant sales manager, Chicago
L. R. Love.....western sales manager, Chicago
R. S. Wildman....vice-president
H. V. Engh.....vice-president, New York
H. Donn Keresey..president, New York
W. E. Sprackling..vice-president, New York
F. L. Meeske.....vice-president
J. N. McDonald...sales promotion, New York
S. D. Fitzpatrick..service manager, New York
H. N. Otis.....manager, rubber covered wire sales
H. G. Burd.....manager, power cable sales
T. J. Little.....manager, special transmission sales

Second Row, Left to Right

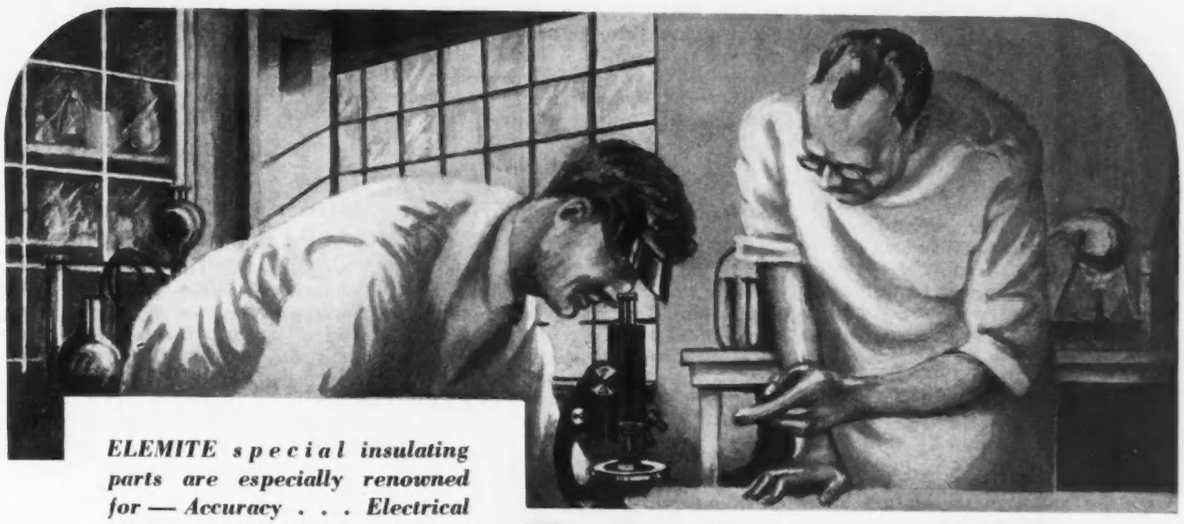
H. E. Stoy.....Atlanta
Lloyd Hanlon.....Los Angeles
Paul Rich.....Chicago
H. D. Hawks.....New York
Wm. R. Collins.....Chicago
A. B. Smith.....New York
D. T. Werner.....Philadelphia
H. W. Simpson.....Chicago
E. C. Turrow.....New York
L. P. Kingsley.....Cincinnati
C. V. Linzer.....New York

Third Row, Left to Right

S. J. Rosch.....Hastings
Lloyd Wolfe.....Seattle
E. B. Hook.....Atlanta
W. A. Jordan.....New York
W. D. Balmain.....New York
C. Dent Slaughter.....San Francisco
J. W. Mullally.....New York
R. B. Steinmetz.....New York
Gray Jones.....Cleveland
A. B. Smedley.....Cincinnati
W. J. Goggin.....New York
J. P. Davis.....Pittsburgh
H. A. Snyder.....Boston

Top Row, Left to Right

F. P. Kennedy.....Philadelphia
Walter Rardin.....Chicago
F. A. Behers.....Marion
T. F. Kelly.....Chicago
H. E. Prescott.....Cleveland
C. H. Porter.....Cincinnati
T. V. Gargan.....Rochester
E. C. Alcott.....Boston
Dudley S. Young.....Chicago
E. C. Johnston.....St. Louis
A. S. McCloy.....Detroit
F. M. MacDuffie.....New York



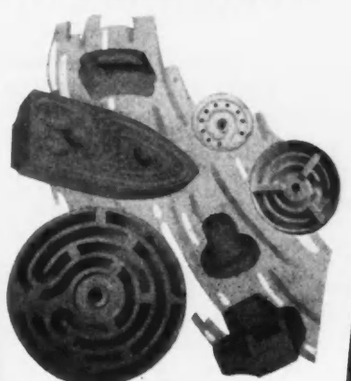
ELEMITE special insulating parts are especially renowned for — Accuracy . . . Electrical appliance and apparatus manufacturers find this characteristic particularly valuable in the assembly of heating elements involving a miscellany of close fitting parts. . . .

Intricate Work

MANY of the more complicated designs of electric heating apparatus and appliances have in their development offered unusually complex insulation problems. It is interesting to note that the great majority of such designs are using ELEMITE insulating parts, not because this famed insulation is competitively priced but because *Louthan Engineers* are accustomed through long experience to master the most difficult assignments. Their ability . . . their craftsmanship makes it possible to form the most intricate designs in ELEMITE . . . and best of all the resultant product is consistently uniform whether the quantity is ten or a million. There is no design too intricate to be made of ELEMITE.

¶ ELEMITE is a heat resisting electrical insulation. . . . It will expand and contract with temperature changes. . . . It will not absorb the heat produced in the element but will actually radiate that heat most effectively. Write for samples of ELEMITE and test it in your own laboratory. . . . *Send model or sketch for price estimates.*

WORTHY INSULATION



for WORTHY APPLIANCES and APPARATUS

THE LOUTHAN MANUFACTURING CO.
CERAMIC SPECIALISTS Elemite ESTABLISHED —1901—
EAST LIVERPOOL - OHIO

RMA Board Called for Cleveland Meeting

President Metcalf of the Radio Manufacturers Association has issued a call for a meeting of its board of directors at Cleveland, Ohio, on Nov. 18, at the Hotel Cleveland. Among other important industry problems to be considered is that regarding the 1931 trade show. The Cleveland meeting of the RMA directors will be coincident with the annual membership meeting of the National Association of Broadcasters, and there will be joint committee consideration by the manufacturers and broadcasters of many affairs in which there is mutual interest—one of these being the pending Copyright Bill in Congress on which joint committees of the RMA and NAB have been working.

Frigidaire and General Motors Radio Announce Sales Combine

Stabilized employment, lower cost of distribution and increased dealer profits is the object of a sales alliance formed by Frigidaire Corporation and General Motors Radio Corporation, both subsidiaries of General Motors, with plants in this city.

The following announcement of the arrangement has been issued jointly by E. G. Biechler, president of Frigidaire Corporation, and R. J. Emmert, president of General Motors Radio Corporation:

"Frigidaire Corporation and General Motors Radio Corporation have formed an alliance which makes it possible in many instances for the General Motors radio and

R. J. Emmert

E. G. Biechler

electric refrigerator to be sold by the same dealer.

"This does not mean that all General Motors radio dealers will at this time have an opportunity to sell Frigidaire, nor does it means that all Frigidaire dealers will be permitted ot sell General Motors radio. The plan, however, does contemplate the same dealers receiving franchises for both commodities where such an arrangement can be made, consistent with the policies of both organizations.

"This is a subject that has been raised many times during the past two or three months by dealers in both organizations, and we are confident that these men who have been interested in an addition to their present line of products will be very much pleased with the progress that has been made.

"We are confident this arrangement will be of tremendous value to both dealer organizations, out of which will come in the future a much stronger merchandising organization, which will insure increased dealer profits, more stabilized employment for both factory employee and salesman, and improved customer service."

C. W. Schwank Joins the STAR-Rite Organization

On Oct. 1 C. W. Schwank became associated with the Fitzgerald Manufacturing Co., of Torrington, Conn., manufacturers of STAR-Rite electrical appliances, as assistant sales manager. Mr. Schwank has had a wide experience in appliance sales, having formerly been connected with

C. W. Schwank

the Frank E. Walcott Co. of Hartford as general manager, and later, when that company was merged with the Beardsley Co. of Waterbury, forming the Beardsley-Walcott Co., Mr. Schwank went with them as vice-president and sales manager of the new organization. With the Fitzgerald company, Mr. Schwank will direct public utility merchandising.

Driver-Harris Officer Honored

Stanley M. Tracey, treasurer of the Driver-Harris Co., Harrison, N. J., was tendered a dinner on Oct. 9 by his associates in celebration of his 20 years' service with the company. He started as office manager of the American Wire Cloth Co., a subsidiary company, and was elected treasurer and director in 1922, and in 1929 he also became director of the British Driver-Harris Co.

Domestic Electric Company Becomes Black & Decker, of Kent, Ohio

It has recently been announced by S. Duncan Black, president of The Black & Decker Manufacturing Co., Towson, Md., that the Domestic Electric Co. of Cleveland and Kent, Ohio, which has been wholly owned by the Towson concern for more than a year, has been renamed the Black & Decker Electric Co. of Kent, Ohio. This company will continue as in the past the manufacture and development of fractional horsepower electric motors. In line with some changes in the executive staff announced at the same time, R. J. Lamb, who has served as a director and as attorney for the company since its inception, becomes president. Other officers of the new company are M. H. Spielman, vice-president and general manager; Oscar C. Kiehne, treasurer and auditor; A. E. Nash, secretary, and Walter Poese, plant manager.

"Market for Electrical Equipment in the Union of South Africa"

The Bureau of Foreign and Domestic Commerce has issued a bulletin entitled "Market for Electrical Equipment in the Union of South Africa," which covers such points as electric current supply, power, industrial uses of current, electrical machinery and equipment, domestic electrical appliances and distribution centers for electrical equipment.

Amplifier Concern Acquires Canadian License

Canadian General Electric Co., Ltd., composed of General Electric, Westinghouse and Northern Electric companies, the last named being Western Electric of Canada, has licensed the Radio Receptor Co. of New York City to build and sell power amplifiers in Canada. The license, which had been under consideration for two years, was issued in the latter part of July, making the Radio Receptor Co. the first American power amplifier concern given permission to manufacture and merchandise amplifiers in Canada.

Professor Thomson Honored

Hailed as one of the world's greatest scientists and engineers in the electrical industry, Prof. Elihu Thomson, director, Thomson research laboratory, General Electric Co., Lynn, Mass., was guest of honor at a testimonial dinner tendered him Sept. 27 at the New Ocean House in

Swampscott, Mass., on the completion of 50 years service in the industry. The dinner was given by the Allied Service Clubs of Lynn.

President Hoover, former President Coolidge, Thomas A. Edison, Governor Allen of Massachusetts, Owen D. Young and Gerard Swope, chairman of the board and president of the General Electric Co., respectively sent their congratulations.

There Is No Magic . . . . .

"A place in the sun" can only be achieved as a result of consistent, pre-determined efforts to do a job, and to do it well.

Relatively young in years, yet wise through experience, Hatfield has carefully wended its way into the forefront of electrical cord manufacturers.

Evolving new and more practical methods of manufacture to assure constant quality in all products . . . scrutinizing minutely each detail of raw material purchase . . . Hatfield has added to its array of varied types of wires . . . until today it stand preëminent. **"You Can't Name a Kind of Electrical Cord that Hatfield Doesn't Make!"**

Hatfield has used no magic. Its present position has been reached through careful research and experimentation and a strict adherence to an iron-clad policy of offering fine products at fair prices.

Hatfield's system of distribution covers the entire country. A Hatfield man is no further from you than your telephone. He will gladly call at your request.

YOU CAN'T NAME A KIND OF ELECTRICAL CORD THAT HATFIELD DOESN'T MAKE

HATFIELD RUBBER WORKS, Inc., HILLSIDE, N. J.

Factories: Hillside, N. J., *and* Hackettstown, N. J.

Philadelphia, Baltimore, Rochester, San Antonio, Los Angeles, Portland, Chicago, Boston, St. Louis, Lincoln, New Orleans, San Francisco, Seattle, Detroit, Cleveland, Pittsburgh, Minneapolis, Denver, Oakland, St. Paul

Brevities

Frank A. Ketcham, president of the Graybar Electric Company, New York City, has been elected a director of the Marine Midland Trust Company of the same city, branch of the Marine Midland Corporation.

Philadelphia Storage Battery Company, Philadelphia, Pa., announces that Roger R. Thompson, for the past five years general sales manager of the refrigeration division of the Welsbach Company, has joined the Philco national organization in an executive sales capacity, with headquarters in Philadelphia.

Warsaw Elevator Company, Warsaw, N. Y., has announced the appointment of A. Bradley Burgess as general sales manager.

American Air Filter Company, Louisville, Ky., is the name for the consolidation of Reed Air Filter Company, Midwest Manufacturing Company and National Air Filter Company. American Air Filter was formerly the holding company for the other three firms.

Safegard Electric Appliance Company, formerly at 133 So. 12th St., Philadelphia, is now located at 1210 Sanson St., the same city.

Pilot Radio & Tube Company, Lawrence, Mass., which hitherto has made only radio parts, kits and tubes, has entered the set field with a new receiver of the midget type.

Ohio Electric Manufacturing Company is the new name for Ohio Electric & Controller Company, 5900 Maurice Ave., Cleveland, manufacturer of lifting magnets and small motors.

H. H. Eby Manufacturing Company, Philadelphia, has moved to 22nd and Lehigh Sts.

J. P. Devine Manufacturing Company, Inc., has moved its executive offices and factory to Mt. Vernon, Ill

Enterprise Electric Company has announced a change of address to 8833 Gratiot Ave., Detroit, Mich.

Electromatic Manufacturing Company, Inc., Newark, N. J., has added O. A. Thomson to its staff, in the capacity of sales manager. Mr. Thomson was formerly with the Kelvinator Sales Corporation.

De Forest Radio Company, Jersey City, N. J., has elected as treasurer and director, Oscar Monrad, president of the Ampco Twist Drill Company. William J. Barkley was elected president, Dr. Lee DeForest, vice-president in charge of research, and Allan B. DuMont, vice-president in charge of engineering.

Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., has appointed as manager of the sales promotion section, domestic appliance department, S. H. Pitman, from 1924-1928 advertising manager of the company's Cincinnati office.

Eureka Electric Equipment Company, North East, Pa., has taken over the commutator manufacturing business which was formerly in the hands of the Eureka Metal Products Company. The latter concern continues their manufacture of pole line hardware.

Kingsford Electro Products Corporation has opened a factory at 34 West 27th St., New York City, where they are engaged in the manufacture of electric supplies, such as heater plugs, cube taps, weatherproof sockets, iron replacement elements, heater elements, custom made resistance coils, and specialty numbers.

The Tassel-Liter Company, manufacturers of a novelty electric smoke lighter, has moved its general offices from their previous location in Chicago to 1276 West Third St., Cleveland, Ohio.

Edison Lamp Works of General Electric Company, Nela Park, Cleveland, Ohio, announces the retirement of Almon D. Page, one-time manager of sales, who until recently has served on the advisory committee of the company. Mr. Page started his business career with the United Edison Company, New York City, in 1889, and went with the Edison Lamp Works at Harrison, N. J., in 1890 as assistant factory manager and manager of sales. He resigned his former position in 1892, but continued as manager of sales until 1925, when he resigned to become a member of the advisory committee.

Dubilier Condenser Corporation, New York City, announces the appointment as general sales manager of M. Caldwell, who previously has held the positions of sales manager for the Marion Steam Shovel Company and export manager for the Certainteed Products Corporation.

The NoRub Washer Company has taken over control of the Dayton Washer Company. Accordingly, they now manufacture both the DuMore washing machine and the NoRub washing machine, and have moved from their former location at Dayton to Gettysburg, Ohio.

Claude Neon Lights, Inc., New York City, announces that the following new members have been elected to the board of directors: William B. Joyce, chairman of the Board of National Surety Company; Stanley F. Hamlin, of White & Case; and Frederic Attwood, vice-president of the Ohio Brass Company.

General Electric Company, Schenectady, N. Y., announces that C. T. Crocker has been appointed designing engineer of the aeronautics and marine department.

Branch Offices and Agencies

Collier Insulated Wire Company, Pawtucket, R. I., announces that Arthur J. Hurley, 291 Congress St., Boston, is now representing them in the Boston territory. Mr. Hurley recently resigned from the Frank W. Morse Company, Boston.

Jenkins and Gunther, manufacturers' representatives, Dallas, Tex., has dissolved partnership. O. T. Jenkins will continue the sales agency, retaining the firm's office. E. T. Gunther will become district field engineer for General Cable Corporation.

General Electric Company, Schenectady, N. Y., announces that W. D. Cameron has been appointed manager of its Detroit office, to succeed the late J. H. Livsey. Since 1927, Mr. Cameron had been assistant manager of the Detroit office. It has also been announced by the General Electric Company that Earle S. Henningsen has been appointed engineer of the alternating current engineering department, succeeding H. G. Reist, who has retired.

The Foxboro Company, Inc., Foxboro, Mass., announces that A. H. Shafer has been appointed manager of its Pittsburgh office, replacing H. S. Gray, who is now in charge of office routine at the home plant.

The Samson-United Corporation, Rochester, N. Y., manufacturer of stainless steel kitchen tools and cutlery, and electrical appliances, announces the opening of a Chicago office in the Merchandise Mart Bldg., Suite 1491. Harry W. Fisher has been appointed manager of this office.

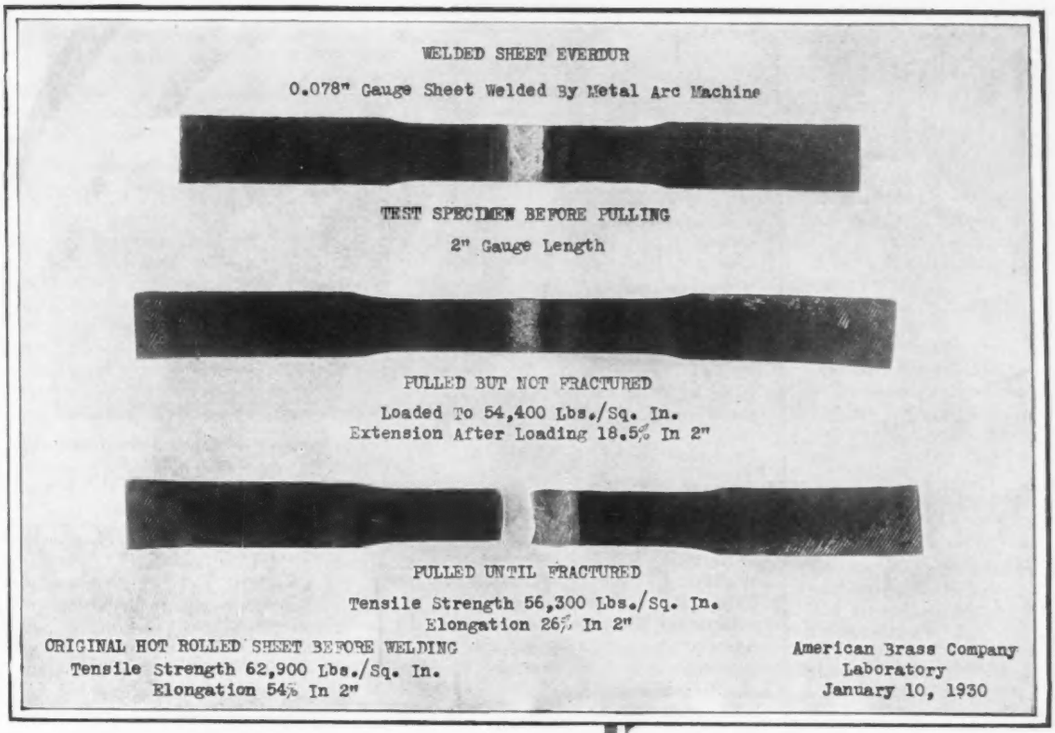
Line Material Company, South Milwaukee, Wis., manufacturers of street lighting equipment, fuses and switches, fiber conduit, substations, brackets and racks, steel pins for insulators, and pole line hardware, announces that early in November they will open a southern branch at Birmingham, Ala., to serve the Southern states. The new plant, containing 10,000 sq. ft. of floor space, will be under the management of Oliver G. Bush. Other branches of the company are located at East Stroudsburg, Pa., Bartin, Wis., Gary, Ind., and Toronto, Ont.

Hygrade Lamp Company, Salem, Mass., announces the opening of a branch sales office at Boston, Mass., located in the Post Office Square Bldg. R. S. Bradner has been appointed manager of the new office.

Pilot Radio & Tube Company, Lawrence, Mass., has established a New York office at 525 Broadway, with Charles Gilbert in charge. The old plant at 323 Berry St., Brooklyn, has been closed down entirely. The personnel of the new office includes Robert Lewis, Bernard Schiller, Harold Wein, Bernard Packman, Edward Hopper, Robert Hertzberg and Alfred A. Ghirardi.

O. W. Coombs, manufacturers' representative, formerly located at 1358 West Washington St., Los Angeles, Cal., announces that effective November 1st he is moving his offices to 1426 Maple Ave., same city.

Nineteen Hundred Corporation, Binghamton, N. Y., announces that its Pittsburgh branch office and warehouse, formerly located at 231 Jenkins Arcade, has been moved to 425 Liberty Avenue.


WELDED SHEET EVERDUR
0.078" Gauge Sheet Welded By Metal Arc Machine
TEST SPECIMEN BEFORE PULLING
2" Gauge Length
PULLED BUT NOT FRACTURED
Loaded To 54,400 Lbs./Sq. In.
Extension After Loading 18.5% In 2"
PULLED UNTIL FRACTURED
Tensile Strength 56,300 Lbs./Sq. In.
Elongation 26% In 2"
ORIGINAL HOT ROLLED SHEET BEFORE WELDING
Tensile Strength 62,900 Lbs./Sq. In.
Elongation 54% In 2"
American Brass Company
Laboratory
January 10, 1930

EVERDUR

Welds Readily

making practical the use of this strong corrosion-resisting metal for welded products . . . .

REG. U. S. EVERDUR PAT. OFF.

ILLUSTRATING a test made on 0.078" gauge Everdur sheet metal arc welded with Everdur Rods. The welded metal was loaded to 56,300 lbs. per sq. in. before failing.

All types of welded joints commonly made in steel can be made in Everdur, which welds readily by the oxy-acetylene, carbon and metal arc methods. Everdur sheet can be continuous-seam or spot welded on automatic machines.

Everdur is a copper [96%], silicon, manganese alloy, produced solely by The American Brass Company in plates, sheets, rod, wire, tubes, blanks, ingots, etc. Full information in Publication E-2. Publication E-4 gives complete data on welding properties.

THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Connecticut
Offices and Agencies in the Principal Cities

ANACONDA
COPPER ANACONDA BRASS

Obituary

Charles A. Mudge, general manager of the Electro Dynamic Company, Bayonne, N. J., died October 11, after an illness of three weeks, in his 60th year.

A graduate of Cornell University, Mr. Mudge joined the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., subsequently affiliating with the Sprague Electric Company of Bloomfield, N. J., where he was engaged in railway motor design. In connection with this he spent a number of years in Germany. After a connection with the General Electric Company in Schenectady, he became manager of the auto starting and lighting department of the United States Heat and Light Corporation of Niagara Falls, N. Y., in 1911. From 1917 until his death he was connected with the Electro Dynamic Company as general manager.

Mr. Mudge was active in various associations, particularly the American Institute of Electrical Engineers and the National Electrical Manufacturers Association, serving on special and standard committees of both organizations.

Manufacturers' Literature

Faries Manufacturing Company, Decatur, Ill.: Illustrated Bulletin No. 36 showing interesting variety of new metal lamp shades and other lighting fixtures and fittings.

H. O. Swoboda, Inc., Pittsburgh, Pa.: Bulletin No. 200, describing "Falcon" electrically heated vertical large coating tanks for asphalts, tars, compounds, oils, varnishes and similar substances.

All - Steel Equipment Company, Aurora, Ill.: Illustrated booklet describing a complete line of cutout boxes, flush cabinets, pull boxes, wiring troughs, special boxes, fuse caps, guttered and weatherproof cabinets.

Hardwick, Hindle, Inc., Newark, N. J.: Catalog No. 630 dealing with enameled slide resistors.

Baker & Company, Newark, N. J.: Booklet on precious metal contacts, giving descriptions, illustrations and reference tables.

Electric Power Equipment Corporation, Philadelphia, Pa.: Bulletin No. 607 describing and illustrating the ELPECO line of lenses, signal boxes and lamps which are intended to serve as indicators on control switches, oil switch indicators on oil structures, signal switches, safety switches, bus potential indicators, and switchboard indicators.

Cochrane Chemical Company, Jersey City, N. J.: Catalog dealing with specifications on radio compounds.

General Electric Company, Schenectady, N. Y.: New catalog pages on the following items:

Oil immersion heaters, GEA 1177B.
Phase protective panels, GEA 132.
Low-speed synchronous motors for direct connection to reciprocating compressors, GEA 529A.
G-E Air-Draw furnaces, GEA 1324.
G-E conveyor furnace, GEA 1174B.
Direct-heat electric furnaces, GEA 37F.

Trumbull Electric Manufacturing Company, Plainville, Conn.: Bulletin for September, 1930, supplementary to Catalog No. 14, giving Revised Price List No. 1 and new material listings. Also new catalog page 47, on Trumbull meter service switches, and index page 139 dated September, 1930.

National Board of Fire Underwriters, Chicago: Booklet containing list of inspected fire protection appliances.

Standard Wire & Tube Company, Mineral Ridge, Ohio: Bulletin No. 4 describing conduit elbows and fittings.

Ohmite Manufacturing Company, Chicago: Reference Catalog showing high resistance units, normal wattage ratings and engineering data.

National Electric Controller Company, 5315 Ravenswood Ave., Chicago: Leaflet describing the National rheostat.

Whitman & Barnes, Detroit. Catalog showing Hercules interchangeable punches and retainers.

General Electric Company, Schenectady, N. Y. Catalog GEA-1291 describing copper brazing and copper brazing furnaces. GEA-1161. Arc welding structural steel GEA-1280 "Centrifugal Compressors." GEA-1035A describing G-E Novalux control apparatus; and various leaflets on motors, generators, control equipment, etc.

Youngstown Sheet & Tube Company, Youngstown, Ohio. 127-page bound volume describing in detail the line of Youngstown Buckeye conduit.

Electrical Engineers Equipment Company, Melrose Park, Ill. Complete volume of Three E equipment including description of indoor switching and protective equipment, insulating supports and bus bar clamps, outdoor switching and protective equipment, electrical conductor fittings, cable end bells, switchboard and bus rack structural devices and insulator pins.

Crouse-Hinds Company, Syracuse, N. Y. Bulletin 2224—"Golf Driving Range and Miniature Golf Course Lighting"; Bulletin 2225—"Baseball Field Lighting."

Erikson Electric Company, Boston, Mass. Catalog 150, Showcase Lighting, and catalog 160, Moderne Store Illumination.

Delco-Light Company, Rochester, N. Y. General information bulletin for architects and builders on complete gas service.

Electric Service Supplies Company, Philadelphia, Pa. Bulletin No. 260 illustrating and describing the installation of Golden Glow floodlighting projectors and lantern floodlights.

Edwin F. Guth Company, St. Louis, Mo. Catalog 18, revised, describing Guth specialties and lighting equipment.

Charleston Electrical Supply Company, Charleston, W. Va. Merchandise Catalog B, showing products for distribution.

Coming Conventions

American Institute of Electrical Engineers—District meeting, Philadelphia, Nov. 13-15. District meeting, Louisville, Ky., Nov. 19-22. Annual Winter Convention, New York City, Jan. 26-30. District meeting, Pittsburgh, Pa., second week in March. District meeting, Rochester, N. Y., May 6-10. Annual Summer Convention, Asheville, N. C., June 22-26. Annual Pacific Coast Convention, September, 1931. F. L. Hutchinson, 33 West 39th St., New York.

National Electrical Credit Association—33rd annual meeting, May 21-22, 1931, New York City. Frederic P. Vose, 1008 Marquette Bldg., Chicago.

Middle & Southern Atlantic States Electrical Credit Association—35th annual meeting, Hotel Sylvania, Philadelphia, Nov. 14. Walter E. Moore, 1334 Real Estate Bldg., Philadelphia.

National Electrical Wholesalers Association—Fall meeting, Hotel William Penn, Pittsburgh, Pa., Nov. 10-14. Spring Convention, The Homestead, Hot Springs, Va., May 25-29, 1931. E. D. Tolles, 165 Broadway, New York.

National Electric Light Association—54th Convention and Exhibition, Atlantic City, N. J., June 8-12, 1931.

National Power Show—Ninth National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York City, December 1-6.

American Society of Heating & Ventilating Engineers — Annual meeting Jan. 27-29, Pittsburgh, Pa. A. B. Hutchinson, 29 W. 39th St., New York City.

American Society of Refrigerating Engineers—Annual meeting New York City, Dec. 3-6. David L. Fisk, 37 W. 39th St., New York City.

For the Man Who Keeps Your Lists

Address Changes

Charles A. Branston, Inc., 299 Ellicott St., Buffalo, N. Y. Formerly at 297 Washington St.

Bersted Manufacturing Company, Chicago: Sales and advertising departments now located at Merchandise Mart. Formerly at 5201 W. 65th St.

Mechanical Specialties Manufacturing Company, 2635 Canton St., Chicago, Ill. Formerly at 1619 N. Washtenaw Ave.

Why *not* PROFIT

by what 200 manufacturers would tell you about embedded* type *heating units?*

FROM your standpoint, these far-sighted manufacturers know what they are talking about. They have been through the experimental stages, made tests. And then found it more economical all around, to adopt Chromalox units—for good.

Built to FIT Your Products

Certainly it's sound business to profit by what they've learned about Chromalox units: How they are built to last; to fit the product itself; to give the right heat. In short, to keep the product operating as it should, for a long time. The patented Chromalox construction of a resistor hydraulically embedded into a heat-conducting, insulating material—makes all this possible.

Lower Assembly Costs

Customers, call us in to help with the final design of their products, to show them the right way to build in the heating units. As a result, assembly costs are lowered. Chromalox units are designed to FIT the product.

Chromalox-equipped Products STAY SOLD

Most of the guess work about your product doing a real job can be easily eliminated by using Chromalox units. Automatically, kicks and come-backs are side-tracked when you use these trouble-free units—another important point those manufacturers will tell you about.

But What About Your Products?

Whether you are working on a new product or improving an old one, we can be of valuable help to you with experience gained from years of working with leading companies making all kinds of electrically heated equipment. When you write for the Chromalox bulletins, tell us about the appliances or heating devices you want properly heated. There's no obligation!

Boiled down to a few words, this is what they'd say . . . .

"Frankly, it is simply a waste of time and money to try to make heating units when it's so easy to buy Chromalox units — really made to fit your products."

Write for your copy of these 8-page bulletins showing dozens of sizes and ratings of the largest complete line of heating units.

*Having the resistor embedded in refractory material under hydraulic pressure and baked at red heat.

Chromalox

ELECTRIC HEATING UNITS

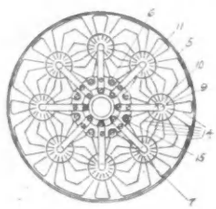
Manufactured Exclusively by . . . Edwin L. Wiegand Company, 7530 Thomas Blvd., Pittsburgh, Penna.

The Month's Electrical Patents

Here, in condensed form, are a few of the recent patents of electrical devices. Lower on the page begins a complete list of all electrical patents for the month preceding publication date.

Electrical Heating Unit

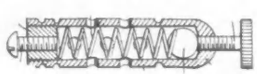
1,776,827. Lewis R. Barber, Fresno, Cal., obtained this patent. It covers an electric air heating unit comprising an outer tubular housing within which are mounted several heating elements in spaced relation



and extending lengthwise with the housing. Several radiating fins surround each heating element. These are so arranged as to form a number of longitudinal air passages.

Binding Post

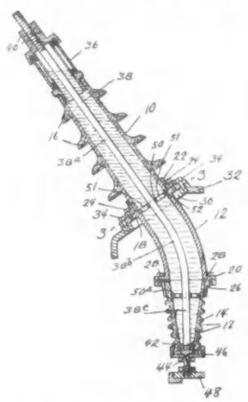
1,776,859. To John Johnston, LaCrosse, Wis., this patent was issued. This binding post has a hollow cylindrical body through which a number of holes are drilled along



diameters of the cylinder. Inside the cylinder is a coiled spring which may be put under varying compression by the thumb screw at the top acting on a ball follower.

Insulating Bushing

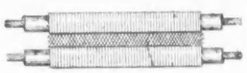
1,777,073. George A. Burnham, Saugus, Mass., obtained this patent and assigned it to Condit Electrical Manufacturing Corp., South Boston, Mass. It concerns an insulating bushing having a bend intermediate between its ends, a conductor extending axially through the bushing and having a



bend conforming with the bend in the bushing, and a spacer member within the bushing to hold the conductor against lateral displacement.

Electric Conductor

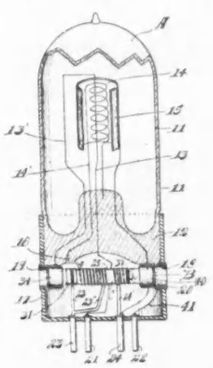
1,776,903. To Albert Hart, Ponders End, England, this patent was issued. It involves an electric conductor including conducting wires, a braided sheath for each



wire, and an integral braided web between and uniting the braided sheaths, the web serving to space the braided sheaths apart.

Vacuum Tube

1,777,011. This patent was issued to Edmund Guyer Murphy, Chicago, Ill. It



covers an electro-responsive device comprising a vacuum tube and removable means within its base whereby circuit regeneration may be obtained.

1,776,787. Net Cathode. Adolf Ergang, Magdeburg, Germany, assignor to The Raguhn-Anhalter Metallocherei, Anhalt, Germany.

1,776,793. Electrical Measuring Instrument. John H. Miller, Oak Park, Ill., assignor to Jewell Electrical Instrument Co., Chicago, Ill.

1,776,796. Electrical Projectile Igniter. Herbert Ruhlemann, Sommerda, Germany, assignor to Rheinische Metallwaaren- und Maschinenfabrik, Dusseldorf-Derendorf, Germany.

1,776,821 and 1,776,822. Automatic Volume-Control System. Maurice E. Strieby, Millburn, N. J., assignor to American Telephone and Telegraph Company.

1,776,845. Electric Resistance Unit. David L. Summey, Waterbury, Conn., assignor to Scovill Manufacturing Company, Waterbury, Conn.

1,776,863. Therapeutic Lamp Unit. Rolland H. Maxson, Milton, Wis., assignor to The Burdick Corporation, Milton, Wis.

1,776,866. Apparatus for the Control of Railway-Car Retarders. Lester E. Spray, Wilkinsburg, Pa., assignor to The Union Switch & Signal Company, Swissvale, Pa.

1,776,872. Rotary Switch. Tony Van Ryan and Alfred Alsaker, Chicago, Ill., assignors to The Delta-Star Electric Company, Chicago, Ill.

1,776,873. Fault Detector for Transformers. Christian Ricard Wegener, Copenhagen, Denmark, assignor to All-Manna Svenska Elektriska Aktiebolaget, Vasteras, Sweden.

1,776,901. Constant-Temperature Regulator. Harry Essex, Otto Gelormimi and Teresa Masterson, Syracuse, N. Y.

1,776,965. Pencil-Sharpener Switch. Raymond E. Bruss, Charleston, S. C.

1,776,987. Electric Phonograph. Adolph A. Thomas, New York City.

1,776,992. Electric Mat Switch. Robert H. Brockman, St. Petersburg, Fla.

1,776,993. Photo-Electric Cell and Process of Producing the Same. Robert C. Burt, Pasadena, Cal., assignor to California Institute of Technology.

1,776,998. Illuminating Means for Taximeters. Julius Gluck, New York, assignor to Ohmer Fare Register Company, Dayton, Ohio.

Copies of any of the patents cited may be obtained by sending 15 cents to the Patent Editor, in care of ELECTRICAL MANUFACTURING, for each copy wanted.

1,777,000. Thermostatic Switch. Morris Kasser, San Francisco, Cal., assignor to Kasser Egg Process Co., San Francisco, Cal.

1,777,003. Portable Lamp. Francis C. Kollath, Chicago, Ill.

1,777,014. Egg Tester. Howard A. Packard, Pierce County, Wash., assignor to Packard Testers, Inc.

1,777,016. Electroopical Image-Producing System. Ralph K. Potter, New York, assignor to American Telephone and Telegraph Company.

1,777,022. Apparatus for Exhausting Tubes. Gerrit Van der Hoeven, Paris, France, assignor to Radio Corporation of America.

1,777,030. Method and Apparatus for Compensating Integrating Meters. Edward S. Briston, Philadelphia, Pa., assignor to Leeds & Northrup Company, Philadelphia, Pa.

1,777,036. Magnetic Pick-up for Phonographs. Ciriaco Y. Coronel, Manila, Philippine Islands.

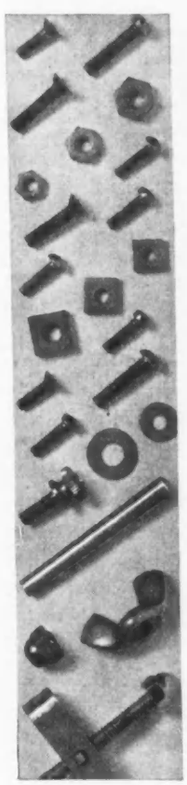
1,777,037. Binaural Recording and Reproducing Sound. Lee De Forest, New York, assignor to de Forest Phonofilm Corporation, New York.

1,777,042. Air Condenser. Fred H. Kroger, Brooklyn, N. Y., assignor to Radio Corporation of America.

1,777,049. Telephone System. John Ellis Ostline, Berwyn, Ill., assignor to Associated Telephone & Telegraph Company, Kansas City, Mo.

UNITED

SCREW AND BOLT CORP.



WHEN two well-reputed manufacturers merge into one, all who deal with them share the benefits. The recent consolidation of Chicago Nut Manufacturing Company and Cleveland Wrought Products Company has brought great convenience to the customers of both concerns.

This new consolidation—United Screw & Bolt Corporation—now offers all who use screw products a better rounded line . . . the convenience of dealing with *one* manufacturer for all requirements . . . the assurance of *larger and more complete stocks* always on hand . . . the satisfaction of branch warehouses *located conveniently near.*

Think of it: over 6000 sizes and styles . . . almost unlimited quantities—always subject to immediate shipment!

The **UNITED** *Line of Products:*

SCREWS
Machine Cap
Binding Set
Knurled Special

BOLTS
Special
Toggle
Expansion

MISCELLANEOUS
Taper Pins Studs
Threaded Wire Shapes
Light Metal Stampings
Plumbers' Bolts, Screws, Nuts and Threaded Rods

NUTS
Machine Screw Knurled
Acorn or Cap Conduit
Castellated Wing
Semi-finished Special

WASHERS
Standard Special
Hardened and Ground

All UNITED Products are available in brass, steel or other metals

UNITED SCREW AND BOLT CORPORATION

Complete stocks conveniently located in

CHICAGO **CLEVELAND** **NEW YORK**

1,777,062. Telephone System. John Wicks, Oak Park, Ill., assignor to Reserve Holding Company, Kansas City, Mo.

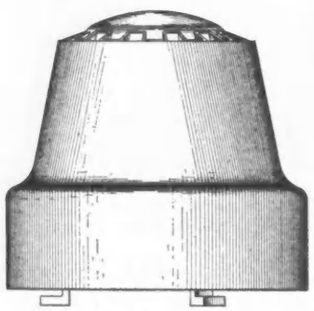
1,777,067. Electric Switch. John A. Amos, Chicago, Ill., assignor to The Pyle-National Company, Chicago, Ill.

1,777,071, 1,777,072 and 1,777,073. Insulator, Electric Switch and Insulating Bushing respectively. George A. Burnham Saugus, Mass., assignor to Condit Electrical Manufacturing Corporation, South Boston, Mass.

1,777,118. Acoustic Device. Henry C. Harrison, Port Washington, N. Y., assignor to Bell Telephone Laboratories, Incorporated.

1,777,120. Condit Coupling. Jacob W. Lewin, Oak Park, Ill.

1,777,131. Push-Button Elevator-Control System. Edwin W. Seeger, South Milwaukee, Wis., assignor to Cutler-Hammer, Inc.



Design Patent 82,335. Refrigerator Unit. Edward B. Mallory, Tenafly, N. J.

1,777,139. Magnetic Sheet Catcher. Joseph G. Fitzgerald and Lewis M. Ripple, Canton, Ohio, assignors to Republic Steel Corporation, Youngstown, Ohio.

1,777,175. Automatic Control Arrangement. Hugh A. McCrea, Schenectady, N. Y., assignor to General Electric Company.

1,777,187. Plug for Electric-Light Fixtures. Hubert E. Wayland, South Knoxville, Tenn.

1,777,202. Electric Cell. Andre Helbronner and Eric Dutt, Paris, France.

1,777,211. Arrangement and Method for Regulating Asynchronous Machines. Johann Ossanna and Hans Graner, Munich, and Fritz Hofmann, Munich-Talkirchen, Germany, assignors to Siemens-Schuckertwerke Aktiengesellschaft, Berlin, Siemensstadt, Germany.

1,777,226. Slot Winding for Electric Machines. Ludwig Roebel, Mannheim, Germany, assignor to Aktiengesellschaft Brown, Boveri & Cie., Baden, Switzerland.

1,777,230. Automatic Control Equipment. Harold T. Seeley, Yeadon, Pa., assignor to General Electric Company.

1,777,253. Oxide Cathode. Johannes Bruijnes, Jacob Van der Hoeven and Ekko Oosterhuis, Eindhoven, Netherlands, assignors to N. V. Philips' Gloeilampen-Fabrieken, Eindhoven, Netherlands.

1,777,256. Transformer. James C. Daley, River Forest, and Edwin G. Goddard and Joseph J. Sola, Chicago, Ill., assignors to Jefferson Electric Company, Chicago, Ill.

1,777,271. Electromagnetic Sound Reproducer. Walter C. Anderson, Glen Rock, N. J., assignor to Brandes Laboratories, Inc., Newark, N. J.

1,777,272. Thermostat Switch. Vilynn O. Beam, Toledo, Ohio, assignor to The Surface Combustion Co., Incorporated, Toledo, Ohio.

1,777,283. Sound-Producing Device. Austin B. Cosgrave, Beachwood, N. J., assignor to The Gamewell Company, Newton Upper Falls, Mass.

1,777,291. Fixture and Outlet-Box Support. Martin M. Clayton, Baden, Pa., assignor to National Electric Products Corporation.

1,777,295. Cable Terminal. Abraham Bernard Dibner, Peekskill, N. Y.

1,777,312. Connecting Plug. Alvin D. Keene, Rochester, N. Y.

1,777,320. Rotor. George W. McCollum, Downers Grove, Ill., assignor to McCollum Hoist & Mfg. Co., Downers Grove, Ill.

1,777,330. Electrical Switch. Joseph F. Seuffert, New York.

1,777,343. Device for the Heating of Windows. Glen S. Wilson, Los Angeles, Cal., assignor of two-thirds to D. E. Stewart, Huntington Park, Cal.

1,777,355. Transmission-Level-Controlling Device. Charles H. Fetter, Millburn, N. J., assignor to American Telephone & Telegraph Company.

1,777,362. Signal-Control Switch. Nicholas Gregorieff, Scotia, Cal.

1,777,374. Wave Antenna. De Loss K. Martin, West Orange, N. J., assignor to American Telephone & Telegraph Co.

1,777,378. Photo-Electric Cell. Ralph K. Potter, New York, assignor to American Telephone & Telegraph Co.

1,777,397. Electrostatic Pick-up Device. William D. Crozier, Geneva, Ill., assignor to United Reproducers Patents Corporation, St. Charles, Ill.

1,777,407. Lighting Fixture. Paul M. Hotchkin, Chicago, Ill.

1,777,409. Method of and Apparatus for Transmitting Motion Pictures. Charles Francis Jenkins, Washington, D. C., assignor to Jenkins Laboratories, Washington, D. C.

1,777,410. Variable Relay Condenser. Lester L. Jones, Oradell, N. J.

1,777,418. Synchronized Photography and Sound. Harrison W. Rogers, New York.

1,777,420. Automatic Toll-Service Trunking System. Victor S. Tharp, Elmhurst, and John Wicks, Oak Park, Ill., assignors to Reserve Holding Company, Kansas City, Mo.

1,777,425. Electric Cipher-Writing Machine. Paul Bernstein. Berlin-Charlottenburg, Germany, assignor to the Firm Chiffriermaschinen Aktiengesellschaft, Berlin, Germany.

1,777,433. Signaling System. George William Hale, London, England.

1,777,436. Charge Indicator for Storage Batteries. Walter E. Holland, Philadelphia, Pa., assignor to Philadelphia Storage Battery Company, Philadelphia.

1,777,482. Heating Apparatus. Otto I. Chormann, Rochester, N. Y., assignor to The Pfaudler Co., Rochester, N. Y.

1,777,486. Mold for Electric-Cured Tires. Alfred A. Glidden, Thomas M. Knowland, and Warren R. Dow, Watertown, Mass., assignors to Hood Rubber Company, Inc., Wilmington, Del.

1,777,500. Indicator. Kenneth M. McLaughlin, Philadelphia, Pa., assignor to Atwater Kent Manufacturing Company, Philadelphia, Pa.

1,777,509. Construction for Lighting Posts and the Like. Western Underwood, Santa Monica, Cal., assignor to La Lux Manufacturing Company, Los Angeles, Cal.

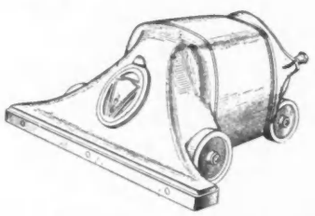
1,777,518. Conduit Box. Russell Paul Dunmire, Erie, Pa., assignor to Erie Malleable Iron Company, Erie, Pa.

1,777,525. Electric-Snap Switch. George J. Meuer, Milwaukee, Wis., assignor to Cutler-Hammer, Inc., Milwaukee, Wis.

1,777,530. Cover for Conduit Outlet Boxes. John T. Pearson and Raymond H. Olley, Syracuse, N. Y., assignors to Crouse-Hinds Company, Syracuse.

1,777,538. Radio Apparatus. Theodore A. Willard, Cleveland Heights, Ohio, assignor to Radio Corporation of America.

1,777,556. Television. Callo D. Fahrney, Cambridge, Mass.



Design Patent 82,265. Casing for a Suction Cleaner. William H. Kitto, Canton, Ohio, assignor to The Hoover Company, North Canton, Ohio.

1,777,571. Coil and Method of Making the Same. Frederick S. McCullough, Edgewood, Pa.

1,777,586. Telephone. Harrison D. Sterick, Pittsburgh, Pa.

1,777,598. Fixture Hanger. George L. Barnes, Los Angeles, Cal.

1,777,625. Headlight for Automobiles. John E. Powers, Lyons, Neb., assignor of one-half to Hans Arthur Nelsen, Lyons, Neb.

1,777,636. Railway Braking Apparatus. Herbert L. Bone, Pittsburgh, Pa., assignor to The Union Switch & Signal Company, Swissyale, Pa.

1,777,644. Apparatus for Severing Glass Sheets. Harry F. Hitner, Oakmont, Pa., assignor to Pittsburgh Plate Glass Company, Pittsburgh, Pa.

1,777,651. Railway Signaling System of the Track-Circuit Type. Leslie Hurst Peter, London, England, assignor to The Union Switch & Signal Company, Swissvale, Pa.

1,777,662. Washing Machine. Axel Olof Engberg and Tord Erik Daniel Bilde, Stockholm, Sweden, assignors to Inventia Patent-Verwertungs-Gesellschaft, Schaffhausen, Switzerland.

1,777,665. Automatic Circuit Breaker. Joseph F. Gibson, York, Pa.

1,777,668. Electrical Generating System. Lester M. Goldsmith, Highland Park, Pa., assignor to The Atlantic Refining Company, Philadelphia.

1,777,690. Radio Relay Distributing System. Edward E. Clement, Washington, D. C., assignor to Edward F. Colladay, Washington, D. C.

1,777,709. Telephone System. Fritz Annelius, Berlin-Charlottenburg, Germany, assignor to Telephon-Apparat-Fabrik E. Zwietusch & Co. G. m.b. H., Charlottenburg, Germany.

1,777,724. Lighting Fixture. David B. Hanna, Chicago, Ill.

1,777,732. Means for Igniting and Controlling Low-Gravity-Fuel Burners. Donald M. Pearson, Oakland, Cal.

1,777,733. Electrical Measuring Instrument. Ernest Reich, Budapest, Hungary.

1,777,744. Portable Heat Blower. Adam A. Breuer, Chicago, Ill.

1,777,755. Electric Jack. Stanley M. Kenerson, Springfield, Mass., assignor to Standard Electric Time Company, Springfield, Mass.

1,777,762. Wire Stretcher and Splicer. Emil W. Nelson, Minneapolis, Minn.

1,777,793. Luminous Character. Frederich Grunhut, Nuremberg, Germany.

1,777,796. Tuning Mechanism. Leroy S. Hubbell, San Francisco, Cal.

1,777,824. Lighting Fixture. Jacob H. Blitzer, New York, assignor to Lightolier Co., New York.

1,777,825. Electrically-operated Track Switch. Georg Bonte, Berlin-Siemensstadt, Germany, assignor to Vereinigte Eisenbahn-Signalwerke Gesellschaft mit beschrankter Haftung, Berlin-Siemensstadt, Germany.

Design Patent 82,244. Magneto-Electric Pocket Lamp. Charles Bernasconi and Rene Marie Berthier, Chambery, France

1,777,843. Water Cooler. Vito Glisci, Waterbury, Conn.

1,777,844 and 1,777,845. Current-Transfer Mechanism and Current Distribution System. Lester M. Goldsmith, Highland Park, Pa., assignor to The Atlantic Refining Company, Philadelphia.

1,777,867. Time-Recording System for Signals. Thomas J. Watson, Short Hills, N. J., assignor to International Time Recording Company, Endicott, N. Y.

1,777,875. Automatic Hammer. Roy J. Champayne, Rockford, Ill.

1,777,877. Snap Switch. Frederick Diehl, Elizabeth, N. J., assignor to Diehl Manufacturing Company, Elizabeth, N. J.

1,777,882. Sorting Machine. Alvin E. Gray, Detroit, Mich., assignor to The Tabulating Machine Company, Endicott, N. Y.

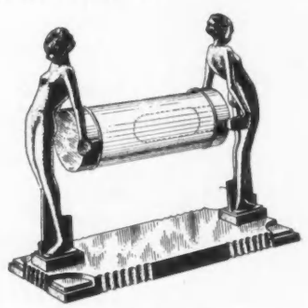
1,777,887. Electric Switch. Ira E. McCabe, Chicago, Ill.

1,777,888. Self-Soldering Circuit Breaker. Roy H. Maple, Indianapolis, Ind., assignor to R. H. Maple Company, Indianapolis.

1,777,924. Telephone Appliance. Joseph S. Jones, Brooklyn, N. Y., assignor to Charles Cory & Son, Incorporated, New York.

1,777,939. Sumation Indicating Instrument. Walter Stern, Berlin-Wilmersdorf, Germany, assignor to Firm Aron-Werke Elektrizitats Aktiengesellschaft, Berlin-Charlottenburg, Germany.

1,777,942. Electric Switch. Vernon Anthony Trier, London, England.



Design Patent 82,199. Lamp. Arthur von Frankenburg, New York

1,777,952. Electric Power-Supply System. Charles G. Adsit, Andrews Drive, and Charles E. Bennett, Decatur, Ga.

1,777,955. Trolley Collector. John Robert Blackhall, Highwood, Ill.

1,777,963. Regulating System for Variable Speed Dynamo-Electric Machines. Albert E. Doman, Syracuse, N. Y., assignor to Owens-Dyneto Corporation, Syracuse, N. Y.

1,777,988. Rheostatic Motor Controller. Gustav

Day in — day out — Sturdy little KON-NEC-TORS operate scores of control devices

Are you manufacturing or planning to manufacture any mechanism that needs a dependable, long-lasting electric switch control?

Then consider the advantages of the sturdy little Kon-nec-tor—pictured here in two of its actual sizes. The Kon-nec-tor is as simple as anything could be and is adaptable to almost any kind of control device. Set it in a holder in which it can rock only slightly—connect your wires to the tungsten inleads—and as the rocking motion connects and separates the two little pools of mercury across the glass tube-pools in which the inleads are sealed—the circuit is alternately made and broken. Thus the Kon-nec-tor can be depended upon to make and break a circuit millions of times. And it makes them, up to about 100 a minute.

The Kon-nec-tor is made of hard, shock-resistant glass. The tube is filled with an inert gas which surrounds the mercury and dissipates heat. Built in this way, the Kon-nec-tor eliminates fire hazard.

Kon-nec-tor 7-10 KRO (unmounted, actual size) designed for currents as high as 25 amperes, voltages up to 250, total wattage capacity 2400, non-inductive load.

Kon-nec-tor 4-21 KRO (unmounted, actual size) designed for currents up to 15 amperes, voltages up to 250, total wattage capacity 1200, non-inductive load.

An extraordinary variety of mechanisms is today controlled by the dependable little Kon-nec-tor. And there are literally hundreds of other devices to which they may be easily and most profitably adapted. Among the mechanisms now operated day in and day out by the always dependable Kon-nec-tor are the following:

Electric ranges, alarm equipment, coin-operated cameras, games and vending machines; dental and medical equipment; electric water heaters; pyrometer controls; news and stock quotation machines, refrigeration and cooling equipment, relays, push-button remote control switch; time controls, float controls; toggle and tumbler switches; sign flashers; traffic controls; elevator limit and safety devices; flashing beacons, etc., etc. For types, sizes, ratings, etc., write for Bulletin 601. General Electric Vapor Lamp Co., 883 Adams Street, Hoboken, N. J.

Join us in the General Electric Hour, broadcast every Saturday evening, on a nation-wide N. B. C. network

GENERAL ELECTRIC VAPOR LAMP COMPANY

(*Formerly Cooper Hewitt Electric Company*)

District Offices

Atlanta, Ga.: 187 Spring St., N. W.
Boston, Mass.: 250 Stuart St.
Charlotte, N. C.: 200 S. Tryon St.
Chicago, Ill.: 37 W. Van Buren St.
Cincinnati, Ohio: 107 E. Fourth St.
Cleveland, Ohio: 1365 Ontario St.
Detroit, Mich.: 3044 W. Grand Blvd.
Hollywood, Calif.: Keese Eng. Co., 7380 Santa Monica Blvd.
Philadelphia, Pa.: 424 Chestnut St.
Pittsburgh, Pa.: 200 Ninth St.
Rochester, N. Y.: 183 Main St., East
San Francisco, Calif.: Keese Eng. Co., 557 Market St.
St. Louis, Mo.: 611 Olive St.

471 © G. E. V. L. Co., 1930

O. Wilms, Milwaukee, Wis., assignor to Reliance Company, Wilmington, Del.

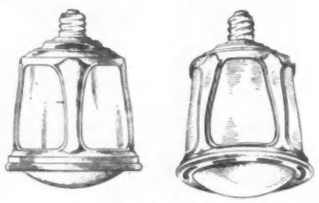
1,778,000. Radiation Meter. Ted E. Foulke, Nutley, N. J., assignor to General Electric Vapor Lamp Company, Hoboken, N. J.

1,778,026. Connection System for Train-Lighting Plants Connected in Parallel. Hugo Grob, Berlin, Germany.

1,778,039. Portable Electric Lamp. Bernhard Rogge, Berlin, Germany.

1,778,040. Flexible Conduit for Electrical Conductors. Charles E. Rutherford, West Hartford, Conn., assignor to The Wire Mold Company, Hartford, Conn.

1,778,048. Electromagnetic Transmitter and Receiver. Adolph A. Thomas, New York.



Design Patent 82,131. Lamp. Charles T. Brady, Detroit, Mich.

1,778,058. Amplifying System. Frederick C. Barton, Schenectady, N. Y., assignor to General Electric Company.

1,778,061. Lamp Fixture. Henry E. Butler, Scotia, N. Y., assignor to General Electric Company.

1,778,062. Adapter for Vacuum-Tube Sockets. Gustav Butzke, Schenectady, N. Y., assignor to General Electric Company.

1,778,072. Clockworks with Electric Winding Device. Jean Geisslinger, Forest Hills, N. Y., assignor to Emile Beck, Geneva, Switzerland.

1,778,077. Remote-Control System. William H. T. Holden, Brooklyn, N. Y., assignor to American Telephone & Telegraph Company.

1,778,082. Ceiling Plate. Edward Howard Lewis, Bridgeport, Conn., assignor to General Electric Company.

1,778,084. Screen Loud-Speaker. James V. Nevin, Long Beach, Cal.

1,778,085. Distortionless Amplifying System. Harry Nyquist, Millburn, N. J., assignor to American Telephone & Telegraph Company.

1,778,087. Switch. Hohn B. Patachon, San Francisco, Cal.

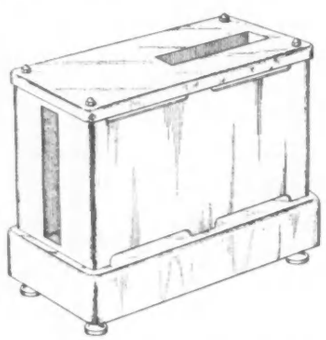
1,778,093. Automatic Electric Time Switch. John L. Thomas, Roxbury, Mass.

1,778,097. Circuit Closer for Stop Mechanism of Knitting Machines and the Like. Jacob Wachsman, Brooklyn, N. Y.

1,778,108. Electric Signal System. Clyde C. Farmer, Pittsburgh, and Thomas H. Thomas, Edgewood, Pa., assignors to The Westinghouse Air Brake Company, Wilmerding, Pa.

1,778,117. Door-Interlocking Device. Joseph C. McCune, Edgewood, Pa., assignor to The Westinghouse Air Brake Company, Wilmerding, Pa.

1,778,120. Light. George H. Osgood, Tacoma, Wash.



Design Patent 82,290. Toaster. Alden B. Starr, Brooklyn, N. Y., assignor to Knapp-Monarch Co.

1,778,129. Door and Brake Control Device. Frank B. Thomas, Wilkinsburg, Pa., assignor to The Westinghouse Air Brake Company, Wilmerding, Pa.

1,778,130. Electric Signal System. Thomas H. Thomas, Edgewood, Pa., assignor to The Westinghouse Air Brake Company, Wilmerding, Pa.

1,778,142. Manicuring Device. August E. R. Blomquist, Cleveland, Ohio.

1,778,151. Outlet Box. William B. Greene, East Cleveland, Ohio; Edna B. Price, administratrix of said William B. Greene, deceased, assignor to The Adapti Company, Ohio.

1,778,152, 1,778,153 and 1,778,154. Multiple-Skirt Suspension Insulator, Insulator-Pin-Centering Means, and Cushion for Insulator Pins respectively. Kent A. Hawley, Victor, N. Y., assignor to Locke Insulator Corporation, Baltimore, Md.

1,778,171. Storage-Battery Container. Almond H. Snyder, Lancaster, N. Y., assignor to Gould Storage Battery Company, Inc., New York.

1,778,172. Railway Signaling Apparatus. Lester E. Spray, Wilkinsburg, Pa., assignor to The Union Switch & Signal Company, Swissvale, Pa.

1,778,176. Insulator. Cloyd B. Van Atta, Baltimore, Md., assignor to Locke Insulator Corporation, Baltimore, Md.

1,778,186. Circuit-Continuing Device. Harry A. Douglas, Bronson, Mich.

1,778,204. Telephone System. John Wicks, Oak Park, Ill., assignor to Reserve Holding Company, Kansas City, Mo.

1,778,207. Test Set. Clarence A. Anderson, Chicago, Ill., assignor to American Electric Company, Inc., Chicago, Ill.

1,778,209. Double-Throw Switch. Charles L. Bugbee, Westmont, N. J., assignor of one-half to Columbus Stamper, Philadelphia, Pa.

1,778,211. Phonograph Pick-up Apparatus. Jean Dieux, Paris, France.

1,778,230. Automatic Telephone System. Norman H. Saunders, Homewood, Ill., assignor to Reserve Holding Company, Kansas City, Mo.

1,778,253. Current Transformer. Franz Joseph Fischer, Dresden, Germany, assignor to Koch & Sterzel, Aktiengesellschaft, Dresden, Germany.

1,778,263. Electrical Cooking Device. Joseph F. Lamb, New Britain, Conn., assignor to Landers, Frary & Clark, New Britain, Conn.

1,778,305. Inclosing Globe. Henry H. Blau, Charleroi, Pa., assignor to Macbeth-Evans Glass Company, Charleroi, Pa.

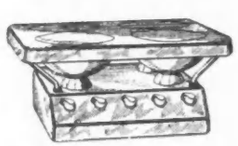
1,778,306. Rheostat. Ernest A. Bohlman, Chicago, Ill., assignor to Kellogg Switchboard & Supply Company, Chicago, Ill.

1,778,308. Acoustic Device. George W. Burchett, Peekskill, N. Y., assignor to Western Electric Company, Inc.

1,778,309. Telephone Metering System. Warren W. Carpenter, Queens Village, N. Y., and Lewis H. Johnson, Madison, N. J., assignors to Bell Telephone Laboratories, Inc.

1,778,311. Receiving Circuits. Hiram D. Currier, Chicago, Ill., assignor to Kellogg Switchboard & Supply Company, Chicago, Ill.

1,778,314. Gas-Control System and Thermostat Therefor. Alfred Diodati, New York.



Design Patent 82,342. Electric Stove. Warren Noble, Detroit, Mich.

1,778,317. Electrohydraulic System for Elevator Brakes and the Like. Harry B. Goldman, Brookline, Pa.

1,778,319. Telephone Metering System. Alfred E. Hague, West Orange, N. J., assignor to Bell Telephone Laboratories, Inc.

1,778,328. Railway-Traffic-Controlling System and Apparatus. Matthew H. Loughridge, Bogota, N. Y.

1,778,349. Time Control for Stokers. Thomas H. Banfield, Portland, Ore.

1,778,374. Electric Music Instrument. Emerich Spielmann, Vienna, Austria.

1,778,376. Armature Binding. Harold Kenneth Whitehorn, Maidstone, England, assignors to Tilling-Stevens Motors, Ltd., Maidstone, Kent, Eng.

1,778,377. Telegraph Repeating Device. Everett T. Burton, Millburn, N. J., assignor to Bell Telephone Laboratories, Inc.

1,778,378. Telephone System. Edward D. Butz, Palisades, N. J., assignor to Bell Telephone Laboratories, Inc.

1,778,383. Battery Filler. Dalph Fry, Rochester, Pa., assignor to Fry Equipment Corporation, Rochester, Pa.

1,778,386. Sound Reproducer. Henry C. Harrison, Port Washington, N. Y., assignor to Bell Telephone Laboratories, Inc.

1,778,392. Coating for Welding Electrodes. Robert E. Kinkead, Cleveland, Ohio, assignor to Hollup Corporation, Illinois.

1,778,398. Winding for Electric Furnaces. Edwin Fitch Northrup, Princeton, N. J., assignor to Ajax Electrothermic Corporation, Ajax Park, N. J.

1,778,400. Telephone Transmitter. Lyndall C. Pocock and Reginald Blackburn, London, England, assignors to Western Electric Company, Inc.

1,778,401. Relay. Edward J. Pratt, New York, assignor to Bell Telephone Laboratories, Inc.

1,778,402. Electromagnetic Sound Reproducer. Percy Rootes, Windsor, England, assignor to Brandes Laboratories, Inc., Newark, N. J.

1,778,407. Selective Switch. James N. Walters, East Orange, N. J., and Edgar H. Clark, Richmond Hill, N. Y., said Walters assignor to American Telephone & Telegraph Company, New York; said Clark assignor to Bell Telephone Laboratories, Inc.

1,778,416 and 1,778,417. Rectifier Circuit and Gas or Vapor Discharge Device. Leroy J. Buttolph, Grantwood, N. J., assignor to General Electric Vapor Lamp Company, Hoboken, N. J.

1,778,439. Retarded-Circuit Maker and Breaker. Warren R. Walker, New Dorp, N. Y., assignor to General Electric Vapor Lamp Company, Hoboken, N. J.

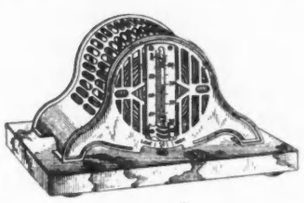
1,778,456 and 1,778,457. Means for Producing Alternating Current. Irving Langmuir, Schenectady, N. Y., assignor to General Electric Company.

1,778,465. Electrical Distribution. Bryce Kenneth Ozanne, Neenah, Wis.

1,778,491. Washing Machine. Lee B. Green, Lakewood, Ohio, assignor to The Borden Company, Warren, Ohio.

1,778,508. Apparatus for Measuring and Recording Pressures. John Sherman Peoples, Ork Park, Ill., assignor to Western Electric Company, Inc., New York.

1,778,509. Electrical Phonograph Apparatus. John N. Ray, Newark, N. J., assignor to Brandes Laboratories, Inc., Newark, N. J.



Design Patent 82,316. Housing for a Portable Thermoswitch. George K. Culp, Dowagiac, Mich.

1,778,529. Manual Key. Harry H. Ide, Chicago, Ill., assignor to American Electric Company, Inc., Chicago.

1,778,539. Railway-Traffic-Controlling Apparatus. Herbert A. Wallace, Edgewood, Pa., assignor to The Union Switch & Signal Co., Swissvale, Pa.

1,778,543. Railway-Switch-Controlling Apparatus. Willard A. Wood, Wilkinsburg, Pa., assignor to The Union Switch & Signal Company, Swissvale, Pa.

1,778,549 and 1,778,550. Electrical Connection Plug. Benjamin F. Conner, Hartford, Conn., assignor to Colt's Patent Fire Arms Manufacturing Co., Hartford, Conn.

1,778,560. Ventilating System and Apparatus. Charles A. Marsh, James L. Strahan, and Albert H. Neller, Fairfield, Iowa, assignors to The Louden Machinery Company, Fairfield, Iowa.

1,778,572. Battery Carrier. John Taylor, Chicago.

1,778,578. Electric Refining Furnace. Thaddeus F. Baily, Alliance, Ohio.

1,778,599. Speed and Power Factor Control of Induction Machines. John I. Hull, Schenectady, and Percy W. Robinson, Scotia, N. Y., assignors to General Electric Company.

1,778,613. Storage Battery. Henry E. Von Grimmenstein, Indianapolis, Ind.

1,778,614. Device for Regulating the Terminal Voltage of Generators. Nicolaas Anthony Johannes Voorhoeve and Johan Christiaan de Haas, Eindhoven, Netherlands, assignors to N. V. Philips' Gloeilampenfabrieken, Eindhoven, Netherlands.

1,778,615. Attachment Plug Cap. Noble H. Watts, Oakland, Cal., assignor to General Electric Company.

1,778,627. Telephone Mouthpiece. Georgie Dorsey, San Francisco, Cal.

1,778,628. Current-Carrying Device. Meril L. Eckman, Detroit, Mich., assignor to Ford Motor Company.

1,778,640. Electrical Generator for Welding or the Like. Harry L. Maher and William A. Andrews, Detroit, Mich., assignors to Ford Motor Company.

1,778,644. Prime-Mover-Control System. Claude W. Place, La Grange, Ill., assignor to General Electric Company.

1,778,645. Electrical Alternating-Current Rectifier. Ernst Presser, Nuremberg, Germany, assignor to Suddeutsche Telefonapparate, Kabel- und Drahtwerke Aktiengesellschaft, Nuremberg, Germany.

1,778,647. Cigar Lighter. John Sinko, Chicago.

1,778,655. Temperature Indicator. Charles W. Wyman, Claremont, N. H., assignor to Sullivan Machinery Company.

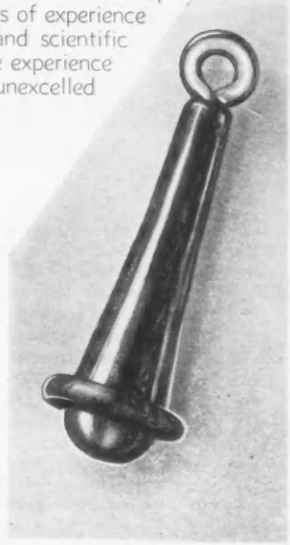
1,778,657. Seal for Vapor Electric Devices. Sataro Aoki, Hiratsuka, Japan, assignor to General Electric Company.

1,778,658. Swivel Joint for Electrical Fittings. Clifford H. Baker, Philadelphia, Pa., assignor to V. V. Fittings Company, Philadelphia.

50 Years' Experience!

World's Largest Molding Plants!

And with those fifty years of successful experience has come practical, technical knowledge that places the American Record Corporation in a position to render a most efficient and helpful service at all times. And, not only is this company well qualified from the past lessons of experience to render superior service—it also has complete, modern and scientific equipment for every phase of the work it has to do. Combine experience with proper facilities for manufacture and you have the typical, unexcelled ARC molded parts service.



The identifying trade-mark of superior molded parts for half a century.

Formerly The Scranton Button Company

American Record Corporation

Molded Parts of PHENOLIC for Every Purpose

BAKELITE DURITE DUREZ LACANITE

Principal Offices and Plants SCRANTON, PENNSYLVANIA

NEW YORK 50 Union Square | CHICAGO 645 Washington Blvd. | CLEVELAND 4900 Euclid Building | DETROIT 145 Eastlawn Ave.

MICA

blocks and splittings

Large quantities of imported mica in the original cases as received from our mines are carried in stock in our plant. We will make immediate shipment.

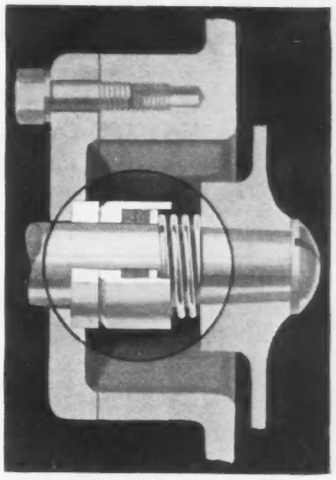
We can also supply sheet mica stamped to your specifications of any desired quality and in any quantity.

EUGENE MUNSELL & CO.

200 Varick St., New York
542 So. Dearborn St., Chicago

INDIA, AFRICAN, SO. AMERICAN
AMBER DOMESTIC

Showing Cooke Seal Style No. 1 applied to small centrifugal pump.



Greatest Little Remedy You Ever Saw!

If you want to eliminate from your product all leakage around a revolving shaft — motor overload — scored shafts—unwelcome noise—frequent repacking —then by all means equip your product with the Cooke Seal Ring.

A mechanical device, revolving with the shaft, it forms a leak-proof ground joint against the gland face, reducing friction and wear and thus saving dollars for maker and user. Already used in scores of different types of machinery, it may be worth its weight in gold, now, when business is hard to get. Write us today for description and prices.

COOKE Seal Ring

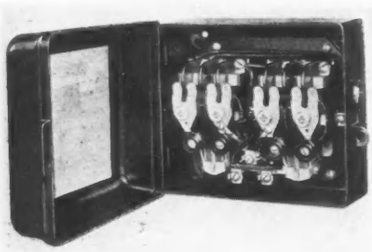
46 N. Green Street, Chicago, Illinois

Dept. "F"

New Goods for Your Inspection

Reversing Contactor

Industrial Controller Division, Square D Co., Milwaukee, Wis. Class 8711, small motor reversing contactor for operating

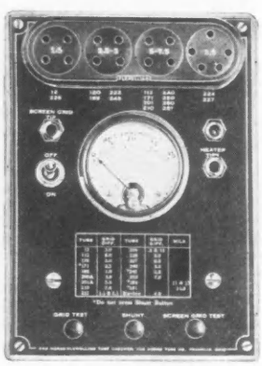


control on small machine tools and for window opening and closing apparatus, etc. The starter is manufactured in two types, one for two wire control only and one for three wire control. The starter may be wired for controlling single phase, three or four wire reversible motors, or three phase motors. Starter consists of two double pole double break contactors which are mechanically interlocked and mounted side by side on a sheet steel panel in a sheet steel case. The contacts both movable and stationary are of silver. Movable contacts are easily removed without the use of tools. The contactor armatures are of the full floating type. The wiring terminals are conveniently located at the top.

These starters are for use with single and three phase motors, 1½ hp., 110 volts, 3 hp., 220 volts. The size of the inclosing case is 8½ in. wide, 6½ in. high and 4¼ in. deep.

Van Horne Tube Checker

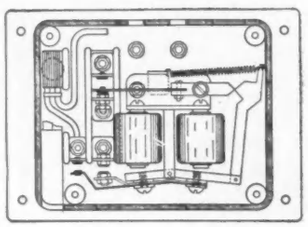
Van Horne Tube Co., Franklin, Ohio. Model D Van Horne Flewelling tube checker enables all tubes to be checked



without the use of adapters. Checks both plates of 280 tubes, the pentode or double screen grid, and the 886 mercury rectifier. There are no live contacts exposed and tubes that are short circuited in any way are indicated without any possible injury to the tube checker. Each instrument equipped with screen-grid lead, heater leads for Kellogg tubes, on and off snap switch, and screws for attaching to the wall. All contacts are cadmium plated.

Safety Heater Control

Safety Regulator Co., 2840½ Guirado St., Los Angeles, Cal., offers a combination air and liquid temperature control switch for all types of electric heaters. This device consists of a double contact relay, controlled by a double contact thermostat built into the relay. Contacts are capable



of breaking 40 amps. A.C. Adjustable differential from 1 to 25 deg. Fahr. Liquid type is equipped with pipe connection for insertion in both open and closed tanks.

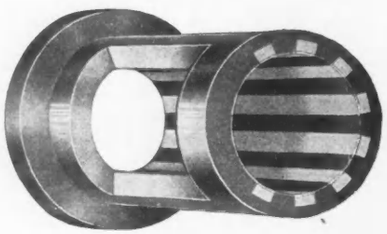
Appliance Switch Plug

Eagle Elec. Mfg. Co., Inc., 59 Hall St., Brooklyn, N. Y., offers an appliance switch plug in Bakelite. It is small and compact.

The same heat resisting phosphor bronze contact clips used in their other types of plugs are embodied in the construction of this Bakelite switch plug.

Bimetallic Armature Bearing

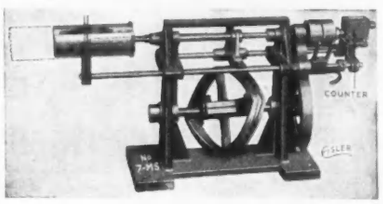
National Bearing Metals Corp., 4930 Manchester Ave., St. Louis, Mo., offers its Vigne bimetallic armature bearing es-



pecially designed for use on railway motors. The bearing is a combination of bronze and lead-base babbitt metal strips in contact with the shaft. The bearing is cast of Tiger bronze. Then longitudinal grooves are milled in, with the bearing surface equally divided between the two metals. These grooves are lined with a high lead content composition. These babbitt strips are sweated and bonded to the bronze bearing. The lead-base babbitt strips, in addition to aiding lubrication, perform the task of overcoming the contraction of the bronze bearing insofar as the axle diameter is concerned. During operation a certain amount of heat is created. The lengthwise grooves allow the bearing to contract and expand on a true circle, at the same time maintaining the same clearance on the axle. When the bronze contracts in the groove, it will force the babbitt strips against the axle. During the cooling-off period the contraction will recede, bringing the lead-base babbitt strips back to their original position. After these bearings have been in operation a short time, the bronze surface strips take on a thin coating of lead, which assures normal operation, even though the lubrication should fail temporarily.

Movable Single Spool Wire Winding Machine

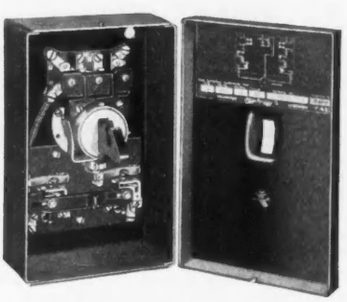
Eisler Elec. Corp., 770 S. 13th St., Newark, N. J., offers a movable single spool wire winding machine in which the spool



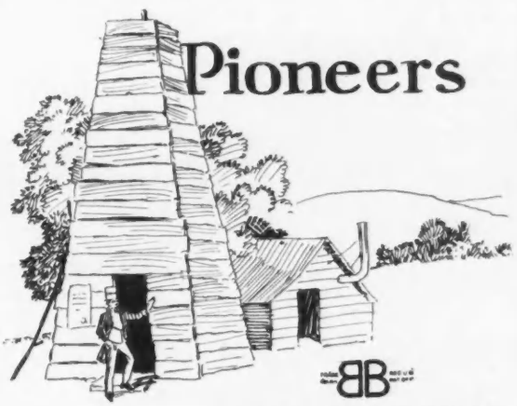
itself moves back and forth, the guide remaining fixed, thus permitting the wire to run straight and directly on to the spool, preventing any scraping. The length of movement of the spool depends on cam motion. This is readily made to suit requirements from 1 to 4 in. The machine is also equipped with reset counter, denoting number of revolutions of spool.

Hand Operated A. C. Starter

Allen-Bradley Co., 1323 S. First St., Milwaukee, Wis., announces a hand-operated A.C. starting switch with overload breakers. This starter handles all motors up to 3 hp., 110 volts, 5 hp. 220 volts, and 7½ hp., 440-550 volts. Overload breakers operating on soldered ratchet principle eliminate the maintenance of thermal plugs



and fuses. They will interrupt any overload and are reset with a lever without opening the switch cover. The starting lever has a safety interlock which prevents cover from being removed unless lever is in "off" position. The switch can be padlocked in open position if required. Its simplicity of construction makes it available for many types of installations.



Pioneers

"BOONTON BAKELITE"

EARLY pioneers in the Pennsylvania fields drilled for oil with makeshift tools, shipped the "crude" in barrels to refineries and established fortunes that staggered the world.

All industry has its pioneers—Boonton Rubber was first to experiment with Bakelite as an electrical insulation and played an important part in bringing that material to its present high state of perfection.

BOONTON RUBBER MFG. COMPANY
223 *Fanny Road*
Boonton, New Jersey
Established 1891

Let us address your Direct Mail Matter . . .

envelopes or broadsides. We have the following classifications on stencils corrected to date:

Electrical Dealers
Electrical Contractor-Dealers
Electrical Contractors
Electrical Jobbers (Wholesalers)
Central Stations
Electrical Manufacturers
Hardware Stores, Department Stores, etc.
Motor Repairers or Rebuilders
Architects
Builders
Consulting Electrical Engineers
Electrical Inspectors
Industrial Plants

Envelopes will be returned to you or we will do enclosing and mailing.

THE GAGE PUBLISHING CO., Inc.
Direct Mail Division
461 Eighth Avenue, New York, N. Y.

Hoover . . . uses Norloc Moulded Handles

HOOVER is a nationally known name, synonomous with cleanliness. Hoover comes to Norton Laboratories for the handles to their vacuum sweepers. Thousands have been moulded . . . and the last thousand is as faithful to their specifications as the first.

Nationally known manufacturers everywhere are coming to Norton . . . to have their moulding requirements filled. They realize that Norton experience in the moulding art is second to none. They realize also that Norton engineers are capable of designing parts for their particular needs which save money and labor.

Why not use Norton Moulding Service in your business? Surely, there is a place in the products which you manufacture for moulded parts. Let Norton Engineers quote on your specifications. There is no obligation.

NORTON LABORATORIES, INC.
Div. 85 LOCKPORT, N. Y.

Norloc

Norton representatives may be reached in the following cities:

Rochester, N. Y.
O. P. Guthrie
423 Powers Building

Chicago, Ill.
Mr. W. M. Craig
228 North LaSalle St.

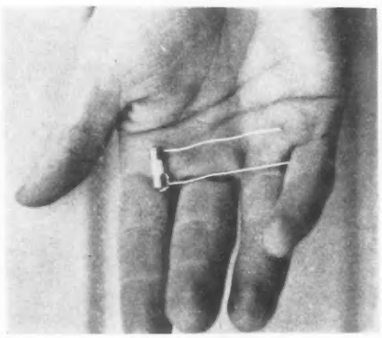
Bridgeport, Conn.
Mr. J. S. Berthold
1115 Main Street

Detroit, Mich.
W. H. Mark Hanna
6-247 General Motors Bldg.

Hillside, N. J.
Mr. A. C. Hall
1262 Miriam Place

Midget Resistor

International Resistance Co., 2006 Chestnut St., Philadelphia, Pa., offers a midget resistor particularly adapted for aeroplane



receivers and for the mantel type receivers that are now growing popular. These resistors are manufactured in ranges from 30 ohms up to 5 megohms and are of a ⅓ watt capacity rating.

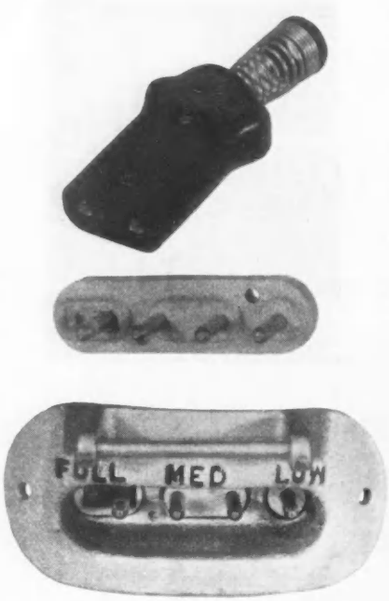
Dynamic Balancer for Armatures

Globe Tool & Engineering Co., Dayton, Ohio, offers a dynamic balancing machine for use of electric motor manufacturers. This machine indicates the value of unbalance in actual values and locates the spot for correction accurately. It is said that one operator reading values can keep two or more others busy making the necessary corrections. The machine is

equipped with a locking brake so as to speed the taking of readings. This brake is also used to hold the armature securely while weights are being added for correcting balance. Special ball bearings with suitable bushings to fit the shaft are placed on the part to be balanced, and this assembly is placed in the machine saddles. These saddles are then locked with a simple movement of a knob, and the part to be balanced is rotated through an auxiliary driving means by a reversible electric motor, which can be plugged into any light socket. First one saddle and then the other is unlocked with the knobs after setting the amplitude indicators and locator stylus to zero. The locator stylus marks the shaft to show the exact point to add the weight to correct the unbalance. A chart which has been previously prepared shows the amount of weight to add or remove at the point the stylus indicates. It is said that with the machine an operator can read and locate values of unbalance in 30 seconds. It is designed to read and locate values as low as 5 grains. Two models are available, one for armatures from 2 to 7 in. in diameter, and shaft lengths of 30 in. between bearings, and one for smaller diameters of 2 in. and under.

Series Parallel Contacts

Harold E. Trent Co., 439-43 N. 12th St., Philadelphia, Pa., offers a three-heat plug with series parallel contacts which



corresponds in theory to three-heat switches used on electric ranges and other electrical appliances. The three-heat plug contact combination uses a standard electric iron plug and a set of four contact posts. By the use of one specially designed post, the apparatus is said to be simplified. These fittings can be safely used on circuits carrying up to 1000 watts. The base is molded porcelain of sufficient length so that it can be attached to a receptacle, the screw holes being conveniently placed.

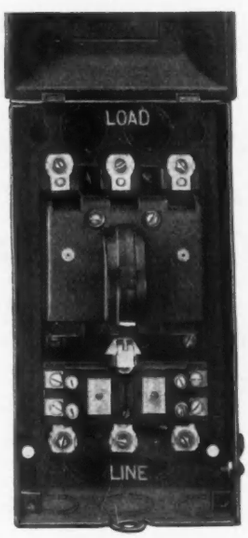
Laminated Bakelite Sockets

H. H. Eby Mfg. Co., Inc., 22nd St. and Lehigh Ave., Philadelphia, Pa., offers two models of laminated Bakelite sockets for radio tubes, available in any marking desired. Model 5-27 UY has a lowest breakdown point of 3500 volts under normal conditions and 3100 volts after exposure to 90 per cent humidity for 48 hours. Mounting holes are on 1-27/16 in. centers. Model 5-9 UX has a lowest breakdown point of 3100 volts under normal conditions and 2700 volts after exposure to 90 per cent humidity for 48 hours. Mounting holes are on 1-9/16 in. centers. These sockets are assembled with two Bakelite punchings. The top plate, in addition to

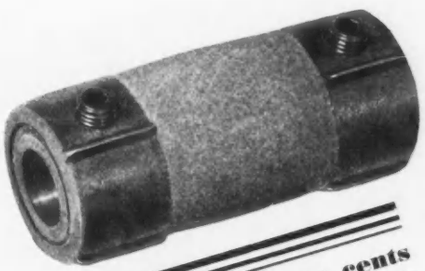
completely insulating the contact eyelets in accordance with approved Underwriters' standards, also acts as a Bakelite barrier between the contacts and minimizes the chances of breakdown. The guide for tube prongs is built-in. Each socket is marked with the number of tube to be inserted. The contact plug is punched from 0.012 in. phosphor bronze tinned in sheets. This contact delivers wiping contact at top and bottom of both sides of tubed prongs. Two holes are provided in the soldering lug.

Small Motor Watchman

Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa., offers its WK-16 Motor Watchman, a small motor starting switch with resettable automatic overload protection. This starter is suitable for use with textile loom and machine tool motors. All ratings are inclosed in the same size box,



4⅞ by 9 by 3-11/16 in. Front handle operation and the choice of top or bottom arrangement of line terminals are two additional features. Automatic overload protection is provided by a method of tripping the contacts by heating a preformed bimetallic disk which does not gradually deflect, but maintains its shape up to a predetermined point. When this point is reached, it snaps to another position, affording a positive tripping means. In its normal position the upper side is convex. When over-heated, this side becomes concave. The door of this switch is hinged at the top. The switch may be locked in the "off" position. The complete overload mechanism is easily removed without changing calibration.



It costs but a few cents more to include as regular equipment, the . . . .

ONEIDA
Flexible Coupling

. . . a husky, shock-absorbing coupler that connects motor to machine and takes up the strains of sudden starts and stops; that soaks up vibration and adds to the life of the machine and motor.

Most of the leading makes of electric clothes washers are ONEIDA-equipped. Tell us how you might use it and we will send you a sample for test.

DELBEE RUBBER CO.
Syracuse, N. Y.

Ask for a Sample

CASE BROTHERS
INCORPORATED

Highland Park, Conn.

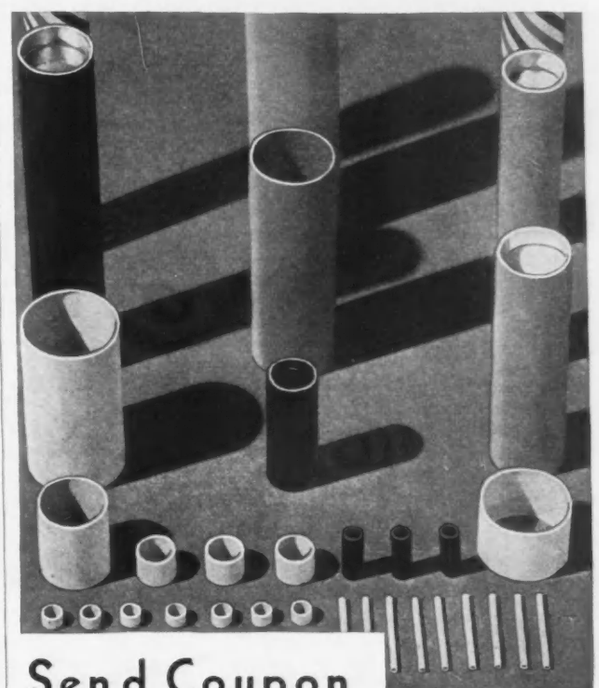
Manufacturers of

Insulating Papers and Boards

Press Boards

Fuller Boards

STONE'S PAPER TUBES



Send Coupon for Samples of These Money Savers

Stone's Paper Tubes save money in electrical manufacturing because they save time, trouble and labor. Use them to protect armature shafts, threaded shaft ends, etc., when painting or varnishing adjoining parts. Use them for *insulation shields* to prevent contact between the wiring and shafts of armatures; for *insulation sleeves* to slip over spliced wires; for *coil form* supports; and many other practical purposes.

We make an infinite variety of sizes (up to one-inch diameter), colors and coatings in open and closed end tubes with various degrees of wall thickness. Large production, specially designed machines, and forty years' experience enable us to serve you promptly and economically. Send coupon for free samples and practical suggestions.

MAIL THIS FOR FREE SAMPLES

STONE PAPER TUBE CO.
Washington, D. C.

Please send us free samples of Stone's Paper Tubes and list of helpful uses.

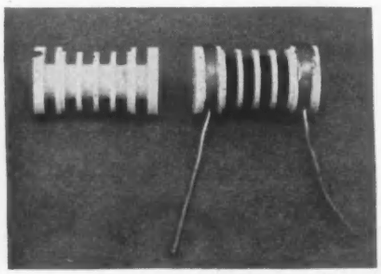
Name of company _____

Address _____

City _____ *State* _____

Precision Resistors

International Resistance Co., 2006 Chestnut St., Philadelphia, Pa., announces a line of wire wound precision resistors for applications calling for precise resistance values, positively maintained at all times, such as in certain radio and photo cell applications. The wire of these resistors is



of nickel alloy, carefully gaged, specially enameled and subjected to a high insulation voltage test through mercury contacts. The wire is the largest possible size consistent with the size of the resistor, thus overcoming insulation problems and providing rugged construction. The wire is wound in the sections formed by the finned ceramic form. A ceramic is used which has a low coefficient of expansion, low moisture absorption, high resistance and close mechanical tolerances. The wound resistor is impregnated in a special varnish which hardens with higher temperatures instead of softening, as wax coated forms do. Units are tested by means of a five-minute flash load at double normal wattage. The units are then tested on accurate bridges to the tolerance required, which may be 1, 0.5 or 0.25 per cent.

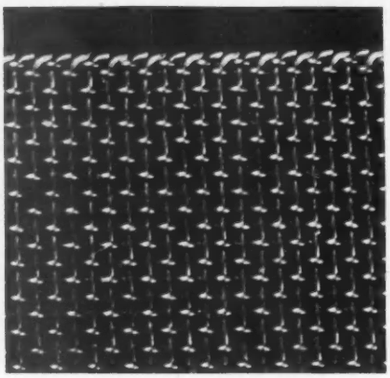
Automatic Temperature Control for Electric Soldering Irons

Supreme Elec. Products Corp., 88 Manhattan St., Rochester, N. Y., offers an automatic temperature control unit for electric soldering irons, which maintains con-

stantly proper soldering temperature on tip of iron, thereby preventing overheating of the iron, frequent renewal of elements and tips, corrosion of tip, cleaning and retinning of tip, spitting of solder when tip is too hot. Pilot light is always burning when current is on the iron. Fluctuating voltage cannot damage the heating element. This unit provides a convenient and safe rest for the iron on the work bench. Tip of iron rests on support in contact with a thermostat. When tip is hot, thermostat cuts in series resistance, which reduces voltage on iron 20 to 25 per cent. This reduced voltage prevents overheating. When the iron cools, the thermostat restores full voltage. The unit has rubber feet, is movable or may be screwed to bench. The pilot is a 10 watt sign lamp.

Sealedged Wirecloth for Tube Screens

Newark Wire Cloth Co., 351 Verona Ave., Newark, N. J., offers its Sealedged nickel wire cloth for use in making screen plates in radio tubes. This screen has



been designed to overcome the difficulty of uneven edges and tendency to unravel. Sealedged mesh cannot unravel, it is claimed. All wire ends are individually bent over. Use of this material in tubes is said to prevent wire dropping out from the cloth. The manufacturers are now making this wire cloth in a number of meshes and widths, and are equipped to make it in any width desired.

Lamicoid Laminated

Mica Insulator Co., 200 Varick St., New York, announces a laminated Bakelite material known as Lamicoid. This is produced in 16 grades. A variety of finishes are available, namely natural, black, brown, straight grain mahogany, straight grain walnut and burled walnut. Three grades are made with Kraft paper base. This can be punched with simple dies in thicknesses up to 3/64 in. cold and ⅛ in. hot. Two other grades have absorbent paper base. Another grade is highly polished and is suitable for panel and fine surface work. Another absorbent paper base material is said to be excellent for high voltage and high frequency insulation. This grade is moisture resistant. There are also several grades using a fabric base, coarse, medium and close weave.

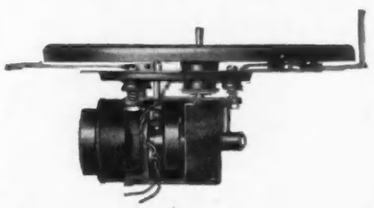
Automatic Base Filling Machine

Eisler Electric Corp., 770 S. 13th St., Newark, N. J., announces an automatic base filling machine for use with lamps and radio tubes. It is interchangeable for all types of bases. This machine automatically fills a predetermined adjustable amount of mixed cement into any type or style of base. The operator is required only to remove filled bases and pick up bases from container on machine and to place base in chuck holder. Machine in-

dexes at fixed intervals of time, regulated by three step pulley on motor. Base holding chuck rotates only when in filling position, and automatic filling arrangement moves down to fill base. A regulating cup is filled with alcohol keeping free the filling device. Track arrangement lifts filled base, making removal of base easy. Approximate production 2000 to 3000 per hour, depending on type of base.

Aristocrat Turntable Motor

Diehl Mfg. Co., Elizabethport, N. J., offers its Aristocrat electric turntable motor for phonographs, combination radio-phonographs and sound projection machines. Among features pointed to by the manufacturer are: Uniform speed, silent operation, positive regulation, quick starting, lack of vibration, no radio interference, small size with light weight, and ease of installation. This turntable motor is furnished for either 78 or 33 r.p.m. It



is built for all voltages and frequencies. It is finished in durable black lacquer, with all steel parts nickel-plated. Fittings are finished in statuary bronze. The motor is supplied with an automatic stop, completely assembled and wired to the motor. A 12 in. turntable is furnished with 78 r.p.m. motors, and a 16 in. turntable is optional with 33 r.p.m. motors. This company also announces its molded composition turntables. These turntables are molded in one piece with reinforcing ribs, and are said to run true and retain their shape indefinitely. The top of each turntable is covered with heavyweight brown felt cemented in place.

BAKELITE

moulded to fit your requirements

Not only are we moulders of Bakelite, but *mould makers* as well. So—the moulding we do for all industry is governed by rich experience with every conceivable kind of a moulding job.

KUHN & JACOB MACHINE & TOOL CO.
502 Prospect Avenue *Trenton, N. J.*

TOYCO SPONGE RUBBER

Also

Solid Soft Rubber Specialties

To shock-proof and insulate all manner of Electrical equipment. Send blue prints for prices and full particulars.

Dept. "W"

The Toycraft Rubber Co., Ashland, Ohio

M-R INSULATION M'F'G CO

"Everything in Insulation"

Compounds, Waxes and Paints
Varnishes and Varnished Materials
Insulating, Waterproofing and Maintenance Paints

Mitchell-Rand Mfg. Co., 19 Vesey St., N. Y.

"Candy's Faultless"

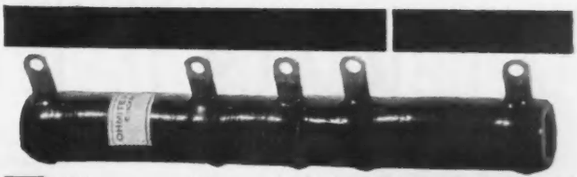
(True to name)

WAXES
INSULATING MATERIALS

for Rubber Covered and Weatherproof Wire, Coils, Condensers, Conduit, Wet and Dry Batteries, Wiring Devices, Sockets, Switchboards, etc. MATERIALS TO YOUR OWN SPECIFICATIONS OUR SPECIALTY. Compounds for Radio Parts.

35 Years' Experience in Compounding

CANDY & COMPANY, Inc.
35th and Maplewood Ave., Chicago, Ill.



Vitreous Enameled RESISTORS

Ohmite's claim for superiority can be fully sustained by operating tests in your own laboratory or X-ray examination.

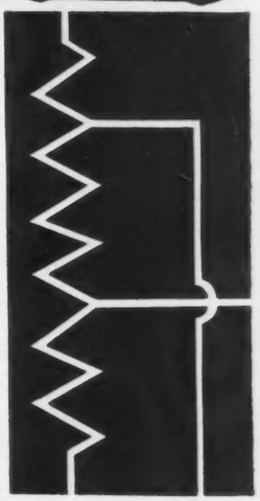
Even spacing, undisturbed by our exclusive enameling processes, insures freedom from hot spots.

Electrically sound terminal connections assure the unvarying output that good performance demands.

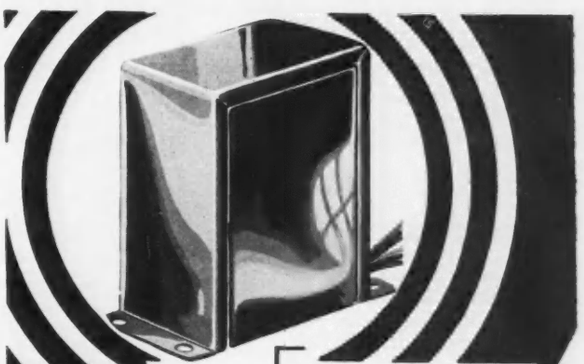
You can depend on Ohmites in your product.

Have you our Engineers' Reference Book?

Ohmite Mfg. Co.
629 N. Albany Ave.
Chicago, Ill.



OHMITE



Electrical CONDENSERS

The more experience you have with Fast Condensers the more respect you will have for them. They embody the utmost in design, materials and perfection of manufacturing processes. When Fasts' cost no more, why be content with a *second-best?* Samples to your specifications on request.

FAST

Specialists in Fixed Condensers

JOHN E. FAST & CO.
3123 N. Crawford Ave., Chicago, Ill.

Classified Index

MATERIALS, PARTS and EQUIPMENT

ON this and the following several pages is a monthly feature of ELECTRICAL MANUFACTURING, an alphabetically arranged classification of all materials, parts and equipment entering into the manufacture of the finished electrical product. Under each subject heading will be found the names of the manufacturers, local addresses and trade names of the products manufactured. Thus "Linolac" insulating varnish will be found in alphabetical position under the heading "Paint, Varnish, Lacquer."

A similar index of all finished electrical products for consumption or resale by wholesalers, contractors, contractor-dealers, central stations and industrial electricians, is a monthly feature of ELECTRICAL INSTALLATION RECORD.

ALLOYS, LIGHT METAL
Bohn Aluminum & Brass Corp., 2512 E. Grand Blvd., Detroit, Mich.
Bohnalite. See Bohn Aluminum & Brass Corp.

ALUMINUM
(Also Aluminum Bronze Powder.)
Albron, Alcoa Alumac. See Aluminum Co. of America.
Aluminum Co of America, 2444 Oliver Bldg., Pittsburgh.
Fairmont Aluminum Co., Fairmont, W. Va.

AMMETERS. See Instruments.

ARMATURE
Balancers. See Balancers, Armature.
Banding Machines. See Banding Machines, Armature
Bearings. See Bearings.
Buggies. See Lifts, Armature.
Coil Presses. See Presses, Armature Coil.
Coils. See Coils, Finished.
Core Punchings. See Discs, Armature.
Cranes. See Lifts, Armature.
Discs. See Discs, Armature.
Driers. See Ovens.
Growlers. See Testers, Coil.
Hoists. See Lifts, Armature.
Impregnators, Vacuum. See Ovens, Industrial.
Jacks. See Lifts, Armature.
Laminations. See Discs, Armature.
Lathes. See Lathes.
Lifts. See Lifts, Armature.
New. See Coils, Finished.
Notching Machines. See Notching Machines, Armature.
Pegs. See Pegs, Armature.
Pinion Pullers. See Pullers, Armature Shaft.
Repaired. See Repairing and Second-Hand.
Shaft Pullers. See Pullers, Armature Shaft.
Shaft Straighteners. See Straighteners, Armature Shaft.
Stands. See Stands, Armature.
Test Benches. See Test Benches, Armature.
Testers. See Testers, Coil; also Test Benches, Armature.
Torpedo Cord. See Twine, Armature Winding.
Trouble Shooters. See Testers, Coil; also Test Benches, Armature.
Trucks. See Lifts, Armature.
Wedges. See Pegs, Armature.
Winding Machines. See Winding Machines, Armature & Field Coil.
Winding Twine. See Twine, Armature.

ARMATURE & COIL SPRAY GUNS. See Spraying Outfits

ARMATURE TWINES. See Twine, Armature.

ARMORING MACHINES. See Wire Manufacturing Machines.

ARMS, FLEXIBLE. See Tubing Flexible Metallic.

ASBESTOS Shades. See Shades, Fabric.
Paper & Sheet. See Asbestos.
Slabs. See Asbestos Slabs.
Tape. See Tape, Asbestos.
Wire. See Wire, Insulated.
Yarn and Thread. See Yarn and Thread.

ASBESTOS
Sheet, Paper, Mill Board, Lumber.
Ambler Asbestos Shingle & Sheathing Co., Ambler, Pa.
Easco. See Eastern Asbestos Co.
Eastern Asbestos Co., Providence, R. I.
Ferode & Asbestos, Inc., New Brunswick, N. J.
Johns-Manville Corp., 292 Madison Ave., New York, N. Y.

ASBESTOS SLABS
Slabs & Barriers for Switchboard.
Asbestos-Ebony. See Johns-Manville, Inc.
Ambler Asbestos Shingle & Sheathing Co., Ambler, Pa.
Decelco, Inc., Wayne, Mich.
Electrobestos. See Johns-Manville Corp.
Ferode & Asbestos, Inc., New Brunswick, N. J.
Johns-Manville Corp., New York, N. Y.
Transite. See Johns-Manville, Inc.
Zellite. See Decelco, Inc.

BAGS, Vacuum Cleaner
Merrimack Mfg. Co., Boston, Mass.

BAKELITE MOULDS. See Dies, Die Makers.

BALANCERS, Armature
(Dynamic Balancing Machines—Balancing Ways).
Armature Coil Equip. Co., 2415 Forestdale Ave., Cleveland, O. (Machine).
Bowsher Co., N. P., South Bend, Ind.
Olsen Lundgren. See Olsen Testing Machine Co.
Olsen Testing Machine Co., Tinius, 500 N. 12th St., Philadelphia, Pa. (Machines)
Sundstrand Machine Tool Co., Rockford, Ill.
Twentieth Century. See Sundstrand Machine Tool Co.
Vibration Specialty Co., 1534 Winter, Philadelphia, Pa. (Machines).

BALL BEARINGS. See Bearings, Ball and Roller.

BANDING MACHINES, Armature
Columbia Machine Wks. & Malleable Iron Co., 263 Chestnut Brooklyn, N. Y.
Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.
Peerless. See Electric Service Supplies Co.
Ridlon Company, Frank, Boston, Mass.

BARRIERS, Switchboard. See Slate; also Soapstone; also Asbestos.

BARS, BUS. See Brass, Bronze & Copper; also Aluminum.

BARS, Commutator
Anaconda. See American Brass Co.
American Brass Co., Waterbury, Conn.
Buckeye Tempered Copper & Brass Co., Mansfield, O.
Cameron Electric Mfg. Co., Ansonia, Conn.
Commutator Co., 121 N. Front, Minneapolis, Minn.

NOLU OILLESS BEARINGS
WOOD IMPREGNATED

Adapted for high or low speed machinery. Never need oil. Increase output. Keeps materials free from soil through elimination of oil. "Thrive on Neglect." Samples on request. Write us.

NOLU OILLESS BEARING CO.
2 East Johnson St.
Germantown, Philadelphia, Pa.

Electric Materials Co., North East, Pa.
Homer Commutator Co., 4748 Hough Ave., Cleveland.
Home Brass & Copper Co., Div. of Revere Copper & Brass, Inc., Rome, N. Y.

BASES, Radio Tube. See Radio Molded Parts.

BASES, Reading Lamp
Metal, Pottery, Wood & Glass.
American Ring Co., Waterbury, Conn.
Aladdin Mfg. Co., 602 E. 18th, Muncie, Ind.
Camar Pottery, Camden, Ark.
Estes & Sons, E. B., 5844 Grand Central Terminal, New
Fulper Pottery Co., Flemington, N. J.
Globe Metal Spinning Co., 178 Centre, New York, N. Y.
Hemill Products, Inc., 103 Mott, New York, N. Y.
Insulation Mfg. Co., New York Ave. and Herkimer St., Brooklyn, N. Y.
Marbleart. See Insulation Mfg. Co.
Natural. See Insulation Mfg. Co
Sneath Glass Co., Wabash Ave., Hartford City, Ind.
Van Briggle Tile & Pottery Co., Colorado Springs, Colo.
Weller, S. A., Zanesville, O. (Pottery.)
Yokel Corp., 219 Homestead Ave., Hartford, Conn.
Zane Pottery Co., South Zanesville, O.

BATTERY CHEMICALS. See Chemicals, Battery.
BATTERY CUT OUTS. See Switches, Battery.
BATTERY GAGES. See Instruments, Pocket.
BATTERY JARS. See Jars, Battery, Glass; also Rubber; also Molded Insulation.
BATTERY OXIDES. See Chemicals, Battery.
BATTERY SALTS. See Chemicals, Battery.
BEAD CHAIN. See Chain, Socket.
BEADS, Chandelier. See Crystals, Chandelier.

BEADS, Insulating
American Lava Corp., 1425 William, Chattanooga, Tenn.
Durco. See Struthers Dunn, Inc.
Martindale Elec. Co., 1262 W. Fourth, Cleveland, O.
Struthers Dunn, Inc., 138 N. Juniper, Philadelphia, Pa.
Stupakoff Laboratories, 6627 Hamilton Ave., Pittsburgh, Pa.

BEARINGS
Ball & Roller. See Bearings, Ball & Roller.
Graphite. See Bearings, Oil-less.
Oil-less. See Bearings, Oil-less.
Sleeve. See Bearings & Bushings.

BEARINGS, Ball and Roller
Aetna Ball Bearing Mfg. Co., Chicago, Ill.
Ahlberg Bearing Co., 312 E. 29th, Chicago, Ill.
American Roller Bearing Co., Pittsburgh, Pa.
Auburn Ball Bearings Co., 57 Clarissa, Rochester, N. Y.
Ball & Roller Bearing Co., Danbury, Conn.
Bantam Ball Bearing Co., South Bend, Ind.
Bearings Co. of America, Lancaster, Pa.
Commercial. See Schatz Mfg. Co.
C J B. See Ahlberg Bearing Co.
Fafnir Bearing Co., New Britain, Conn.
Federal Bearing Co., Inc., Poughkeepsie, N. Y.
Gurney Ball Bearing Div., Marlin-Rockwell Corp., Jamestown, N. Y.
Gwilliam Co., 360 Furman, Brooklyn, N. Y.
Hoffman. See Norma-Hoffman Bearings Corp.
Hoover Steel Ball Co., Ann Arbor, Mich.
Hyatt Roller Bearing Div. of General Motors Corp., Harrison, N. J.
McGill Metal Co., Valparaiso, Ind.
Mathews Mfg. Co., 184 Gold, Worcester, Mass.
New Departure Mfg. Co., Bristol, Conn.
Nice Ball Bearing Co. (Nicetown), Philadelphia, Pa.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Roller Bearing Co. of America, Whitehead Rd., Trenton.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Schubert. See McGill Metal Co.
S R B. See Standard Steel & Bearings, Inc.
Standard Steel & &Bearings, Inc., Div. of Marlin-Rockwell Corp., Plainville, Conn.
Strom Bearings Co., 4587 Palmer, Chicago, Ill.
S. K. F. Industries, 40 E. 34th, New York, N. Y.
Timken Roller Bearing Co., Canton, O.
Torrington Co., Torrington, Conn.
Zubler Bearings Co., 1321 W. Tioga, Philadelphia, Pa.

Ball and Socket Joint

INSULATORS
Ask for samples
STRUTHERS DUNN, INC.
134 North Juniper Street, Philadelphia, Pa.

BEARINGS, Oil-Less
Argute Oilless Bearings Co., 149 Berkeley, Philadelphia, Pa.
B. M. C. See Burlington Metal Corp.
Bogert & Hopper, Inc., 225 Varick, New York, N. Y.
Bound Brook Oil-less Bearing Co., Bound Brook, N. J.
Burlington Metal Corp., Burlington, Wis.
Cleveland Graphite Bronze Co., 889 E. 72nd, Cleveland, O.
Electric Railway Equipment Co., 30 Church, New York, N. Y.
Elreco. See Electric Railway Equipment Co.
Graphalloy. See Graphite Metallizing Co.
Graphite Metallizing Co., 1050 Nepperhan Ave., Yonkers, N. Y.
Lubrite. See Merriam Bros., Yonkers, N. Y.
Merriam Bros., 185 Amory, Boston, Mass.
Metal Saw & Machine Co., Springfield, Mass.
Moraine Products Co., First & Foundry Sts., Dayton, O.
Neveroil Bearing Co., Wakefield, Mass.
Nolu Oilless Bearing Co., 2 E. Johnson (Germantown), Philadelphia, Pa.
O. & S. Bearing Co., 315 S. Artillery, Detroit, Mich.
Reliance. See Metal Saw & Machine Co.
Seib Lignum-Vitae Woodturning Co., 98 Boyd Ave., Jersey City, N. J.
United States Graphite Co., Saginaw, Mich.

BEARINGS AND BUSHINGS
(For Armature Shafts.)
Ajax Metal Co., Philadelphia, Pa.
American Bronze Corp., Berwyn, Pa.
Bohn Aluminum & Brass Corp., 2512 E. Grand Blvd., Detroit, Mich.
Bunting Brass & Bronze Co., Toledo, Ohio
Cadman Mfg. Co., G. W., Pittsburgh, Pa.
Damascus Bronze Co., Pittsburgh, Pa.
Durex. See Moraine Products Co.
Erie Bronze Co., 1832 Chestnut, Erie, Pa.
Federal-Mogul Corp., Shoemaker & Lillibridge Sts., Detroit,
Flood City Brass & Elec. Co., Johnstown, Pa.
Johnson Bronze Co., New Castle, Pa.
Lumen Bearing Co., Buffalo, N. Y.
Moraine Products Co., First & Foundry Sts., Dayton, O.
United States Graphite Co., Saginaw, Mich.

BELTING, Chain Transmission. See Chain, Power Transmission.

BELTS, Rubber
Molded Cord Rubber Belts for Electrical Appliances.
Dayton Rubber Mfg. Co., Dayton, O.
Fay Rubber Products Co., Elyria, O.
Gilmer Co., L. H., Cottman & Keystone Sts. (Tacony), Philadelphia, Pa.

BENDERS, Coil Loop
Armature Coil Equipment Co., 2415 Forestdale Ave., Cleveland, Ohio
Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.
Segur. See Electric Service Supplies Co.

BENDING. See Punching & Bending.
BINDING POSTS. See Posts, Binding.

BLADES, Fan
Estes & Sons, E. B., 5844 Grand Central Terminal Bldg., New York, N. Y.
Reading Elec. Co., Inc., 24 Frankfort, New York, N. Y.
Torrington Mfg. Co., Torrington, Conn
BLOCKS, Terminal. See Terminal Blocks.

BLOWERS, Armature
For Dusting Out Motors.
Big Midget. See Sturtevant Co.
Breuer Elec. Mfg. Co., 852 Blackhawk, Chicago, Ill.
Clements Mfg. Co., 609 Fulton, Chicago, Ill.
Cyclone Portable Electric Blower Co., 222 N. 12th, Philadelphia, Pa.
Electric Blower Co., 352 Atlantic Ave., Boston 9, Mass.
Ideal Commutator Dresser Co., 1008 Park Ave., Sycamore, Ill.
Marvel. See Electric Blower Co.
Sanitator. See United Elec. Co.
Cadillac. See Clements Mfg. Co.
Standard Elecl. Tool Co., 1939 W. Eighth, Cincinnati, O.
Sturtevant Co., B. F. (Hyde Park), Boston, Mass.
Tornado. See Breuer Elec. Mfg. Co.
United Elec. Co., 1230 8th, Canton, O.
United States Elecl. Tool Co., 2488 W. Sixth, Cincinnati, O.

BLUESTONE. See Chemicals, Battery.
BOARD, Fuller. See Cloth and Paper.
BOARD, Press. See Cloth and Paper.
BOMBARDING MACHINES. See Machines, Lamp Making
BOWL HOLDERS. See Fixture Fittings
BOX & CABINET BUSHINGS. See Bushings, Box & Cabinet.

BOX BOARD
Container Corp. of America, 111 W. Washington, Chicago

BOXES, Fibre
Container Corp. of America, 111 W. Washington, Chicago
BOXES, Sheet Steel. See Cabinets, Sheet Steel.
BOXES, Wood. See Cabinets & Boxes, Wood.

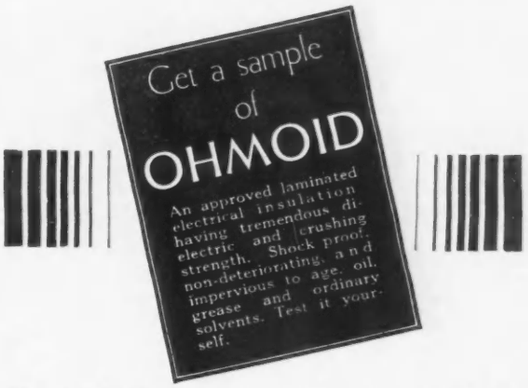
BOXES AND WRAPPERS
Brown & Bailey Co., 417 N. Eighth, Philadelphia, Pa.
Bulldog. See Pittsburgh Corrugated Paper Box Co.

FABRICATED FIBRE

Wilmington Fibre Specialty Co. not only manufactures fibre but fabricates it by the million pieces, in thousands of shapes and for a multitude of uses.

Here you will find a dual service—controlling each step in the making of the basic material, then turning it cut in a plant where the daily production capacity is 3,000,000 pieces.

And if the manufacturer wishes to do his own fibre fabricating, we will ship any quantity of rod, sheet or tube fibre. Write for quotations.


Get a sample
of
OHMOID
An approved laminated electrical insulation having tremendous dielectric and crushing strength. Shock proof, non-deteriorating, and impervious to age, oil, grease and ordinary solvents. Test it yourself.

WILMINGTON FIBRE SPECIALTY CO.
World's Largest Manufacturers of Fibre Specialties Wilmington, Del.

INSULATING PAPERS FOR THE ELECTRICAL INDUSTRY

Red Rope Paper
Armature Paper
Imitation Pressboard
Cable Paper
Glassine

Made by
RIEGEL PAPER CORPORATION
342 Madison Ave. New York
MILLS IN NEW JERSEY
AT RIEGELSVILLE AND MILFORD

BOXES AND WRAPPERS—Continued
Campbell Paper Box Co., 904 S. Main, South Bend, Ind.
Consolidated Paper Co., Monroe, Mich.
Container Corp. of America, 111 W. Washington, Chicago.
Gair Co., Robert, 420 Lexington Ave., New York. (Boxes.)
Gator-Hide Kraft. See International Paper Co.
Hinde & Dauch Paper Co., 325 Decatur, Sandusky, Ohio.
Huntington Paper Box Co., Huntington, Ind.
International Paper Co., 100 E. 42nd, New York, N. Y.
Lake Lithographing Co., 2570 Superior Ave., Cleveland, O. (Display Cartons.)
Myracol See Container Corp. of America
National Folding Box Co., New Haven, Conn. (Cartons.)
Pequot Mfg. Corp., Glendale (L. I.), New York.
Pittsburgh Corrugated Paper Box Co., 1414 Spring Garden Ave., Pittsburgh, Pa.
River Raisin Paper Co., Monroe, Mich.
Shuttleworth Carton Co., 474 W. Broadway, New York.

BRACKETS, Instrument
For Suspending Meters to Station Switchboard.
General Electric Co., Schenectady, N. Y.
Roller-Smith Co., 239 Broadway, New York, N. Y.
Trumbull Elec. Mfg. Co., Plainville, Conn.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

BRAIDING MACHINES. See Wire Manufacturing Machines.
BRASS TUBING. See Tubing, Brass and Copper.

BRASS, BRONZE AND COPPER
Sheet, Rod, Bar.
Anaconda. See American Brass Co.
American Brass Co., Waterbury, Conn.
American Nickeloid Co., Peru, Ill.
Baltimore Brass Co., 1212 Wicomico, Baltimore, Md.
Baltimore Copper Mills, Div. of Revere Copper & Brass, Inc., Baltimore, Md.
Bohn Aluminum & Brass Corp., 2513 E. Grand Blvd., Detroit, Mich.
Bohnalite. See Bohn Aluminum & Brass Corp.
Bridgeport Brass Co., 774 E. Main, Bridgeport, Conn.
Buffalo Bronze Die Cast Corp., 100 Arthur, Buffalo, N. Y.
Dallas Brass & Copper Co., Div. of Revere Copper & Brass, Inc., 120 Orleans, Chicago, Ill.
Durbar. See Buffalo Bronze Die Cast Corp.
Electric Materials Co., North East, Pa.
Federal-Mogul Corp., Shoemaker & Lillibridge Sts., Detroit, Fredericksen Co., Saginaw, Mich.
Higgins Brass & Mfg. Co., Div. of Revere Copper & Brass, Inc., 13435 Dequindre, Detroit, Mich.
Johnson Bronze Co., New Castle, Pa.
Metal & Alloy Specialties Co., 1875 Elmwood Ave., Buffalo, N. Y.
Metaloy. See Metal & Alloy Specialties Co.
Michigan Copper & Brass Co., Div. of Revere Copper & Brass, Inc., 5851 W. Jefferson Ave., Detroit, Mich.
Nickeloid. See American Nickeloid Co.
Plume & Atwood Mfg. Co., 474 Bank, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Sebeco. See Fredericksen Co.
Seymour Mfg. Co., Seymour, Conn.
Taunton-New Bedford Copper Co., Div. of Revere Copper & Brass, Inc., Taunton, Mass.
Titan Metal Mfg. Co., Bellefonte, Pa. (Rods and Forgings.)
Western Cartridge Co., East Alton, Ill.

BREAKERS, Circuit. See Circuit Breakers.
BRIDGES, Wheatstone. See Instruments, Laboratory Standard.
BRONZE. See Brass, Bronze and Copper; also Castings.
BRONZE, Phosphor. See Phosphor Bronze.
BRONZE POWDER, Aluminum. See Aluminum.
BRUSH HOLDERS. See Brushes, Commutator.
BRUSHES, Carbon. See Brushes, Commutator.
Graphite. See Brushes, Commutator.
Metal Graphite. See Brushes, Commutator.

BRUSHES, COMMUTATOR
(Brushes, Brush Holders and Flexible Leads.)
Brush Holders ..... See B
Carbon, Graphite, Metal Graphite ..... See C
Flexible Leads and Pig Tails ..... See L
Sheet Metal ..... See S
Wire Gauze ..... See W
Automotive Mfg. Co., Kansas City, Mo. .... H
B. B. B See Becker Bros. Elec'l Corp.
Baylis Co., Bloomfield, N. J. .... H
Becker Bros. Elec. Corp., 23 N. Jefferson, Chicago, Ill. .... C W S H L
Blanck & Carrier Corp., 115 W. 63rd, New York, N. Y. C
Boxill-Bruel Carbon Co., Columbia, O. .... C .... H
Calebaugh Self-Lubricating Carbon Co., 1503 Columbia Ave., Philadelphia, Pa. C
Carbon Engrg. Co., Slinger, Wis. .... C I
Carbon Laboratories Co., 5005 Euclid Ave., Cleveland O C
Carbon & Graphite Corp., 227 W. Broadway, N. Y. C. C
Carenco See Carbon Engineering Co
Chapin Co., Chas. E., 227 Fulton St., N.Y.C. C W S L
Columbia Machine Wks. & M. I. Co., 261 Chestnut, Brooklyn, N. Y. .... H
Cooley Mfg. Co., 98 Park Place, New York .. W
Diamond C. See Chapin Co., Chas. E.
Dixon Crucible Co., Monmouth St., Jersey City C
Electra. See Automotive Mfg. Co.
Electric Accessories Co., 310 York Ave., Philadelphia, Pa. .... H
Electro-Nite Carbon Co., 508 N. Fourth, Philadelphia, Pa. C
Fleck Carbon Co., 508 Broome, New York. C W L
General Cable Corp., 420 Lexington Ave., New York, N. Y. .... W L
General Electric Co., Schenectady, N. Y. .... C .... H L
Graphalloy See Graphite Metalizing Corp.
Graphite Metalizing Corp., 1050 Nepperhan Ave., Yonkers, N. Y. .... C .... H
Henrite Products Co., 98 Park Pl., N.Y.C. C .... H
Holland Trolley Supply Co., 1623 E. 48rd, Cleveland, Ohio .... H

Keystone Carbon Co., 4630 N. 11th, Philadelphia, Pa. C
Kohlenite Products Co., 92-34 152nd St., Jamaica, N. Y. C
Le Carbone Co., 15th St., Hoboken, N. J. C
Le Valley Vitas Carbon Brush Co., 4851 Grand Central Terminal, New York, N. Y. C
Marks Elec. Co., Hiram, 304 Woodward Ave., Detroit, Mich. C
Morganite Brush Co., 33-02 48th Ave., Long Island City, N. Y. C
National Carbon Co., Cleveland, O. C
New Process Carbon Co., 1503 Columbia Ave., Philadelphia, Pa. .... C L
No Spark. See Calebaugh Self-Lubricating.
Ohio Carbon Co., 12508 Almira Ave., Cleveland, Ohio .... C W L
Ohio Elec Specialty Mfg. Co., Troy, O. .... W
Perfection Supply Co., 98 Park Pl., N.Y.C. C W S H L
Pittsburgh Carbon Brush Co., 801 Fulton, Pittsburgh, Pa C
Pure Carbon Co., Wellsville, N. Y. .... C W S .. L
Pyramid. See National Carbon Co.
Reaction. See Baylis Co.
Reading Elec. Co., Inc., 24 Frankfort, N.Y.C. C L
Salem Electrical Supply Co., 285½ Bridge, Salem, Mass. .... W
Sharr & Co., Geo. W., 110 S. Ninth, St. Louis, Mo. C
Speer Carbon Co., St. Mary's, Pa. C
Stackpole Carbon Co., St. Mary's, Pa. C
Sterling. See Carbon Laboratories Co.
Superior Carbon Products Co., North Rd., Poughkeepsie, N. Y. C
U. S. Graphite Co., Saginaw, Mich. C
Universal. See Graphite Metalizing Corp.
Weber Elec Wks., Brooklyn Sta., Cleveland. C L

BRUSHES, PNEUMATIC SPRAYING. See Spraying Outfits.

BRUSHES FOR VACUUM CLEANERS
Omaha Brush Co., 320 N. 15th, Omaha, Neb. (Brushes rebristled.)
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, Ohio.

BUGGIES. Armature. See Lifts, Armature.

BULBS, Glass
For Incandescent Lamps and Tubes.
Almo Mfg. Co., 38 Crawford, Newark, N. J.
Corning Glass Wks., Corning, N. Y.

BUNCHING MACHINES. See Wire Manufacturing Machines.
BUS BAR. See Brass, Bronze and Copper. Also Aluminum.
BUSHINGS, SHAFT. See Bearings and Bushings.

BUSHINGS, Box and Cabinet, Porcelain
Appleton Electric Co., 1703 Wellington Ave., Chicago, Ill.
Columbia Metal Box Co., 260 E. 143rd St., New York, N. Y.
Harter. See Multi Elecl. Mfg. Co.
Knox Porcelain Corp., Knoxville, Tenn.
Mineralac Electric Co., 1045 Washington Blvd., Chicago, Ill.
Multi Electric Mfg. Co., 1840 W. 14th Ave., Chicago, Ill.
Nelson Elec. Co., Plant City, Fla.

CABINET GRILL CLOTH See Cloth, Untreated.

CABINETS, Fibre
Continental-Diamond Fibre Co., Newark, Del.
Vulcanoid See Continental-Diamond Fibre Co.

CABINETS, Refrigerator. See Refrigerator Cabinets.

CABINETS, Sheet Steel
Stamped and Turned-up Boxes and Cabinets.
Acme Blow Pipe & Sheet Metal Wks., 713 Magazine, New Orleans, La.
Adam Electric Co., Frank, St. Louis, Mo.
All-Steel-Equip. Co., Aurora, Ill.
American Metal Wks., 4865 Stenton Ave., Philadelphia, Pa.
American Steel Furniture Co., 27 W. 24th, New York, N. Y.
Artisan Sheet Metal Corp., 53 Gorham, Rochester, N. Y.
Benjamin Elec. Co., W. A., 1378 E. 16th, Los Angeles, Cal.
Berger Mfg. Co., Canton, Ohio
Berthold Elec. Co., Gus, 551 W. Monroe, Chicago, Ill.
Bonnell Elec. Mfg. Co., 192 Chambers, New York, N. Y.
Chicago Hdwe. Foundry Co., 1516 Merchandise Mart, Chicago
C. & P Electric Wks., Springfield, Mass.
Coast Specialty Co., 73 E. Sixth, Portland, Ore.
Cole Electric Products Co., 85 Crescent, Long Island City.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Columbia Metal Box Co., 260 E. 143rd St., New York, N. Y.
Columbian Steel Tank Co., 1505 W. 12th, Kansas City, Mo
Commercial Mfg. & Supply Co., 1443 Delaware St., Denver.
Creiger Electrical Mfg. Co., 609 W. Lake, Chicago, Ill.
Diamond Elec'l Mfg. Co., 1330 E. 10th, Los Angeles, Cal.
Dowman-Dozier Mfg. Co., 1314 Murphy Ave., S. W., Atlanta, Ga.
Electric Apparatus Co., 704 N. Halsted, Chicago, Ill.
Electric Panelboard Co., 426 Exchange, Rochester, N. Y.
Federal Steel Products Co., 2 Ave. L, Newark, N. J. (Polarized Boxes.)
Fouch Elec. Mfg. Co., 105 N. Ninth, Portland, Ore.
Greater New York Metal Box Co., Inc., 143 W. 19th, N.Y.C.
Gurney Sheet Metal Wks. 718 E. 4th, Long Beach, Cal.
Holzer Sheet Metal Wks., Inc., 317 Burgandy, New Orleans, La.
Insert Co., J. H., 1234 Rowan, Louisville, Ky.
Karp Metal Products Co., 129 30th, Brooklyn, N. Y
Largo-Dali Mfg. Co., 811 N. Tenth, Philadelphia.
Lexington Elec. Products Co., 12 Chapel, Newark, N. J.
Lorentzen, H. K., 155 Leonard, New York, N. Y.
MacMillen Mfg. Co., 1400 N. Spring, Los Angeles, Cal.
Mansfield Elec. Hardware Co., Longview Ave., Mansfield, O.
Metropolitan Elec. Co., 2914 First Ave., S., Seattle, Wash.
Metropolitan Elec. Products Co., Blvd. at 14th, Long Island City, N. Y.
Milwaukee Vault & Cabinet Co., 521 Market, Milwaukee.
Mosher, S. L., 1951 Lawrence, Denver, Colo.
National Metal Box Co., Van Dyke & Ferris Sts., Brooklyn.
Newman Elec. & Mfg. Co., Eau Claire, Wis.
Par-Metal Products Corp., 3519 41st, Long Island City, N. Y.
Penn Electrical Co., 35 Water, Irwin, Pa.
Powerlite Switchboard Co., 4149 E. 79th, Cleveland, O.
Rezioh. See Holzer Sheet Metal Works.

Robbins & Myers Sales, Inc., Springfield, O.
Standard Metal Box Corp., 950 Grand St., Brooklyn, N. Y.
Star Metal Box Co., 238 46th, Brooklyn, N. Y.
Superior Switchboard & Devices Co., 420 Schreyer Ave., Canton, O.
Tanner & Co., Wm. F., 511 S. Sharp, Baltimore, Md.
United Mail Box Co., 473 President, Brooklyn, N. Y.
United Sheet Metal Wks., 375 Howard, San Francisco.
Universal Metal Box & Products Co., 316 Colt, Irvington, N. J.
Wadsworth Elec. Mfg. Co., Covington, Ky.
Wiegman & Co., E. M., 1908 Benton, St. Louis, Mo.
Wurdack Elec. Mfg. Co., 4444 Clayton Ave., St. Louis, Mo.

CABINETS AND BOXES, Wood
Accurate Molding Corp., 20 Morton, Brooklyn, N. Y.
Adler Mfg. Co., Louisville, Ky.
Adler Royal. See Adler Mfg. Co.
Art Woodworking Co., Inc., 1035 Seattle Blvd., Seattle.
Boehm Cabinet Co., J., 2216 W. 63rd St., Cleveland, O.
Carlon. See Art Woodworking Co.
Carolina Wood Products Co., Asheville, N. C.
Carrom Co., Ludington, Mich.
Caswell-Runyon Co., Huntington, Ind.
Cary Cabinet Corp., 1427 N. 15th, St. Louis, Mo.
Cheney Piano Action Co., A. C., Castleton, N. Y.
Chickasaw Furniture Mfg. Co., Memphis, Tenn.
Conrades Mfg. Co., 1942 N. Second, St. Louis, Mo.
Conner Furniture Co., New Albany, Ind.
Continental Radio Corp., East Pontiac, Fort Wayne, Ind.
Corbett Cabinet Mfg. Co., St. Mary's, Pa.
Cory Cabinet Corp., Springfield, Mo.
Dekker Co., Geo., Henderson, Ky.
Ebert Furniture Co., 225 W. 34th, New York, N. Y.
Efein & Sons, Frederick, 44 Central Ave., Brooklyn, N. Y.
Empire-United Hat Block Co., 312 E. 32nd, New York.
Estes & Sons, E. B., 5844 Grand Central Terminal Bldg., New York, N. Y.
Excello Products Corp., 4836 W. 16th (Cicero), Chicago, Ill.
Federal Wood Products Corp., 206 Lexington Ave., N.Y.C.
Grand Rapids Furniture Co., Grand Rapids, Mich.
Harper Mfg. Co., Cassopolis, Mich.
Hickory Box Co., Hickory, N. C.
Hubbell, H. L., 59 Market Ave. N. W., Grandville, Mich.
Interstate Woodworking Co., 46 Wooster, New York, N. Y.
Karpen. See Studner Bros.
Klumpp Sons, John G., 13 Baxter, New York, N. Y.
Knoxville Table & Chair Co., Knoxville, Tenn.
National Cabinet Co., New Philadelphia, O.
New England Box Co., Greenfield, Mass.
Ohio Valley Cabinet Co., Wheeling (Warwood), W. Va.
Oneida Cabinet Corp., Oneida, N. Y.
Ottawa Furniture Co., Holland, Mich.
Phono-End-Table. See Continental Radio Corp.
Pooley Co., 16th & Indiana Ave., Philadelphia, Pa.
Radio Cabinet & Equipment Co., 1504 Vine, Philadelphia
Radio Mfg. Co., Div. of Pilliod Lumber Co., Swanton, O.
Radio Master Corp., Bay City, Mich.
Red Lion Cabinet Co., Red Lion, Pa.
R. E. Z. Cabinet Co., 54 North, Boston, Mass.
Schutz Bros., 153 Chambers, New York, N. Y
Showers Bros. Co., Bloomington, Ind.
Signal Elec. Mfg. Co., Menominee, Mich.
Southern Toy Co., Hickory, N. C.
Specialty Display Case Co., Kendallville, Ind.
Starr Piano Co., Richmond, Ind.
Steitner Phonograph Corp., 469 Kent Ave., Brooklyn, N. Y.
Studner Bros., 67 W. 44th, New York, N. Y.
Superior Cabinet Corp., 206 Broadway, New York, N. Y
Syracuse Screen & Grille Co., North Manchester, Ind.
Tessier Bros., 355 Bridge, Northampton, Mass. (Radio.)
Trenton Wood Specialty Co., Stokes Ave. and P. R. R. Trenton, N. J.
Udell Wks., 28th and Barnes Ave., Indianapolis, Ind.
Watsontown Table & Furniture Co., Watsontown, Pa.
West Box Co., 235 Liberty, Springfield, Mass
Wood Cabinet Corp., 196 Lexington Ave., New York, N. Y
CABLE ARMORING MACHINES. See Wire Manufacturing Machines
CABLE TEST SETS. See Instruments, Portable and Switchboard.
CABLING MACHINES. See Wire Manufacturing Machines

CANDLES, Fixture
Glass. Fibre Paper.
Brandywine Fibre Products Co., 1402 Walnut, Wilmington
Cleveland Container Co., 10330 Berea Rd., Cleveland, O.
Fibro Products Co., New Bedford, Mass.
Franklin Fibre Specialty Co., 173 Lafayette, New York, N. Y
Phoenix Glass Co., Monaca, Pa.
Remington Mfg. Co., 939 Barnum Ave., Bridgeport, Conn.
Seamless. See Fibro Products Co.
Universal Brass Wks., 209 Vine, Philadelphia, Pa.
CANOPY (Canopies). See Fixture Fittings.
Insulators. See Insulators.
Switches. See Switches, Snap.
CAPACITORS, RADIO. See Radio Circuit Components

CARBON, Powdered
Marks Elec. Co., Hiram, 304 Woodward Ave., Detroit, Mich
CARBONS, Battery. See Cartons.
Arc Light. See Carbons.

CARBONS
Battery Arc Light.
Becker Bros. Elecl. Corp., 23 N. Jefferson, Chicago, Ill
Blanck & Carrier Corp., 115 W. 63rd, New York, N. Y.
Columbia. See National Carbon Co.
Daylight. See National Carbon Co.
Lessing. See Blanck & Carrier Corp.
Nuernberg. See Blanck & Carrier Corp.
National Carbon Co., Cleveland Ohio.
Oretip. See National Carbon Co.
Speer Carbon Co., St. Mary's, Pa.
Stackpole Carbon Co., St. Mary's, Pa.
White Flame. See National Carbon Co.
CARTONS. See Boxes and Wrappers.
CASEIN PLASTICS. See Molded Insulation.
CASES, Eliminator. See Cases, Eliminator.
Flashlight. See Cases, Flashlight.

Is Your Product Written Into Specifications?

. . . then include your advertising in the pages of ELECTRICAL SPECIFICATIONS—the one publication devoted exclusively to the electrical planning of buildings . . . and read by 10,000 architects and electrical engineers who control a Four Billion market annually. Show your products at all points of specifications with this Gage Publication—

ELECTRICAL SPECIFICATIONS

A GAGE PUBLICATION

LAVA ACCURACY . . .

Synonymous words whenever an insulator is needed

•

inquiries solicited

•

AMERICAN LAVA CORP.

1425 William St.
Chattanooga, Tennessee

Manufacturers of Electric and Heat Resistant Insulators

PROPERLY MOULDED BAKELITE PARTS

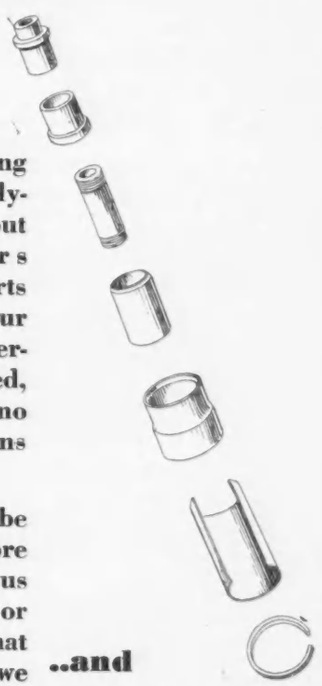
insure absolute accuracy and exact uniformity in your product. They save time in assembling—eliminate expensive machining operations—lower your manufacturing costs. They require neither buffing nor polishing, yet have a fine and lasting finish—in colors if desired. Their tensile and dielectric strength is high. They are unaffected by moisture, oils and most acids. Ours is the largest plant in the Middle West devoted exclusively to the manufacture of moulds and custom moulding of Bakelite parts.

Write for our catalog.

Chicago Moulded Products Corp.
2144 Walnut Street :: Chicago, Illinois
Subsidiary of Plymouth Mfg. Co.

Fibre parts made from our fibre tubing as a base

Fibre BRANDYWINE



In an amazing number, Brandywine turns out special orders for fibre parts made from our tubing—counterbored, drilled, threaded — no two operations alike.

If it can be made from fibre tubing, send us a sample or sketch of what you want and we will send a quotation that will please you.

Brandywine Fibre Products Company
1402 Walnut St.
Wilmington
Delaware

..and fibre tubing in any length

we sell many thousands of feet of full length fibre tubes to customers who do their own work. Let us hear from you.

AVAILABLE--

. . . to Electrical Manufacturers, over 36 years' successful experience in DIE-CASTING. The good will of a long list of satisfied customers is proof of our ability to serve efficiently and economically. Our own metallurgist checks alloys used in all our castings. We design and make our own dies. Let us quote.

Franklin Die Casting Corporation
826 Gifford St., Syracuse, N. Y.
Pioneers of the Die-Casting Industry

PHOENIX Die Castings

Inquire for

High Tensile Strength Alloys

PHOENIX DIE CASTING CO.
21 Illinois St., Buffalo, New York

"GRAY"

HEATER PLUG CLIPS

Made in large quantities on special machines. Manufacturers buy from us for less than it would cost them to make their own contacts. Shall we mail samples and prices to you?

CONTRACT WORK—Let us manufacture your product and serve as your factory. Write us.

GRAY BROTHERS, Inc., Plano, Ill.

CASES, Eliminator
Brumberger Co., 252 Pearl, New York, N. Y.
Grand Sheet Metal Wks., 176 Grand, New York, N. Y.
Karp Metal Products Co., 129 30th, Brooklyn.
Luma Metal Products Co., 38 Emerson Pl., Brooklyn, N. Y.

CASES, Flashlight
Bridgeport Brass Co., 744 E. Main, Bridgeport, Conn
Lincoln Fibre Specialty Co., Newport, Del.
St. Louis Paper Can & Tube Co., St. Louis, Mo.

CASTINGS, Aluminum. See Castings, Aluminum. Also Castings, Copper, etc.
Brass. See Castings.
Bronze. See Castings.
Copper. See Castings.
Die. See Castings, Die.
Monel Metal. See Castings.
Steel. See Castings, Steel.
White Metal. See Castings.

CASTINGS, Aluminum
American Aluminum Ware, 368 Jeliff Ave., Newark, N. J.
Aluminum Co. of America, 2444 Oliver Bldg., Pittsburgh.
Bergen Point Brass Foundry, Sixth & Ave A, Bayonne, N. J.
Berks Foundry & Mfg. Co., West Hamberg, Pa.
Bohn Aluminum & Brass Corp., 2512 E. Grand Blvd., Detroit, Mich.
Bonnell Elec. Mfg. Co., 192 Chambers, New York, N. Y
Dick Bros., Inc., Reading, Pa.
Fairmont Aluminum Co., Fairmont, W. Va.
Faries Mfg. Co., Decatur, Ill.
Monarch Aluminum Ware Co., 9301 Detroit Ave., Cleveland
National Bronze & Aluminum Foundry Co., 88th & Lazy Cleveland O.
Quality Aluminum Casting Co., Waukesha, Wis.
Sterling Die Casting Co., 749 39th, Brooklyn, N. Y.
Tenual. See National Bronze & Aluminum Foundry Co
United Metal Mfg. Co., Inc., 25 Shipping, Norwich, Conn.
Veco Mfg. Co., South Norwalk, Conn.

CASTINGS, Die
Alemite Die-Casting & Mfg. Co., Woodstock, Ill.
Allied Die-Casting Corp., 43rd Ave. from 38th to 39th, Long Island City, N. Y.
Alumac. See Aluminum Co. of America.
Aluminum Co. of America, 2444 Oliver Bldg., Pittsburgh.
American Brass Co., Waterbury Conn.
Anaconda. See American Brass Co.
American Die Casting Co., 2040 Dominick, Chicago, Ill.
Badger Die Casting Co., 155 Buffalo, Milwaukee, Wis.
Barnhardt Bros. & Spindler, Monroe & Throop St., Chicago.
Bohn Aluminum & Brass Corp., 2512 E. Grand Blvd., Detroit, Mich.
Bohnalite. See Bohn Aluminum & Brass Corp.
Do-Di. See Doehler Die Casting Co.
Doehler Die Casting Co., 236 Fourth Ave., New York, N. Y.
Franklin Die Casting Corp., 826 Gifford, Syracuse, N. Y.
Illinois Die Castings Co., 551 W. Congress, Chicago, Ill.
Krone-Seebek Die Casting & Mfg. Co., 2935 W. 47th, Chicago, Ill.
Milwaukee Die Casting Co., 239 Fourth, Milwaukee, Wis.
National Die Casting Co., 600 N. Albany Ave., Chicago.
Newton Die Casting Corp., 146 Munson, New Haven Conn.
Paragon Die Casting Co., 2701 N. Crawford Ave., Chicago.
Parker White Metal & Machine Co., Erie, Pa.
Permite. See Aluminum Industries, Inc.
Phoenix Die Castings Co., 21 Illinois, Buffalo, N. Y.
Pittsburgh Die Casting Co., 7508 Ardmore, Swissvale, Pa.
Precision Die Casting Corp., Syracuse, N. Y.
Republic Die Casting Co., 128 Mott, New York, N. Y.
Stewart Die Casting Co., 4500 Fullerton Ave., Chicago, Ill.
Superior Die Casting Co., 875 E. 70th, Cleveland, Ohio.
Twin City Die Castings Co., Talmadge and 33rd Aves., S. E., Minneapolis, Minn. (White Metal).

CASTINGS, Gray iron
American Engineering Co., Philadelphia, Pa.
Athens Foundry Co., Athens, Pa.
Barlow Foundry Co., 551 N. J. R. R. Ave., Newark, N. J.
Berks Foundry & Mfg. Co., West Hamberg, Pa.
Bonnell Elec. Mfg. Co., 192 Chambers, New York, N. Y.
Bridgeport Castings Co., 250 North Ave., Bridgeport, Conn.
Chicago Hardware Foundry Co., 1516 Merchandise Mart, Chicago, Ill.
Dick Bros., Inc., Reading, Pa.
Fairmount Foundry, Inc., Third & Westmoreland Sts., Philadelphia, Pa.
Farquhar Co., Ltd., A. B., York, Pa.
Forest City-Walworth Run Fuondries Co., 2500 W. 27th, Cleveland, O.
Gray Iron Foundry Co., Reading, Pa.
Laytham & Son Co., Wm. P. 889 Market, Paterson, N. J.
Milwaukee Grey Iron Foundry Co., 3910 Mitchell, Milwaukee, Wis.
Products Machine Co., Bridgeport, Conn.
Sacks Iron Foundry L. 357 Wilson Ave., Newark N J
Sharples Separator Co., Biddle & Patten Ave., Westchester, Pa.
Snead & Co. Pine St., Jersey City, N. J.
Union Mfg. Co., New Britain, Conn.
Western Foundry Co., Kedzie Ave. at 36th, Chicago, Ill.

CASTINGS, Malleable Iron
Eastern Malleable Iron Co., Naugatuck, Conn.
St. Louis Malleable Castings Co., 7701 N. Conduit Ave., St. Louis, Mo.

CASTINGS, Non-Ferrous
Copper, Brass, Bronze, Monel Metal, White Metal.
Anderson Mfg. Co., Albert & J. M., 289 A Boston, Mass.
American Manganese Bronze Co., Holmesburg, Philadelphia.
Atlas Brass Foundry Co., Columbus, O.
Barnard Foundry Co., 9 Roseland, Springfield Mass
Bergen Point Brass Foundry, Sixth & Ave A, Bayonne, N. J.
Berks Foundry & Mfg. Co., West Hamberg, Pa
Bohn Aluminum & Brass Corp., 2512 E. Grand Blvd., Detroit, Mich.
Bonnell Elec. Mfg. Co., 192 Chambers, New York, N. Y.
Buffalo Bronze Die Cast Corp., 100 Arthur, Buffalo, N. Y.
Bridgeport Castings Co., 250 North Ave., Bridgeport, Conn.
Cadman Mfg. Co., A. W., Pittsburgh, Pa.
Central Pattern & Foundry Co., 3737 S. Sacramento Ave., Chicago, Ill.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Hardware Foundry Co., 1516 Merchandise Mart, Chicago, Ill.
Creamer & Co., W. G., 572 Smith, Brooklyn, N. Y.
Davis & Zuckerman, 514 E. 11th, New York, N. Y.
Delta Star Electric Co., 2437 Fulton, Chicago, Ill.
Dick Bros., Inc., Reading, Pa.
Erie Bronze Co., 1832 Chestnut, Erie, Pa.
Faries Mfg. Co. Decatur, Ill.
Federal-Mogul Corp., Shoemaker & Lillibridge Sts., Detroit
Harsch Bronze & Foundry Co., John, 11612 Madison Ave., Cleveland, O.
Johnson Bronze Co., New Castle, Pa.
McGill Metal Co., Valparaiso, Ind.
National Bronze & Aluminum Foundry Co., 88th & Lazy, Cleveland, O.
Ohio Pattern Wks. & Fdy. Co., 2730 Spring Grove Ave., Cincinnati, O.
Rabun Bronze Foundry, 617 West Belgrave, Huntington Park, Cal.
Tenual. See National Bronze & Aluminum Foundry Co.
United Metal Mfg. Co., Inc., 25 Shipping, Norwich, Conn
Walden Tool & Metal Mfg. Co., 3 Oxford, New Haven, Conn.

CASTINGS, Steel
Bonney-Floyd Co., Marion Rd., Columbus, Ohio
Eastern Steel Casting Co., Ave. L & Edward St., Newark.
Northwestern Steel & Iron Corp., 2907 Fourth, S. E., Minneapolis, Minn.
Pittsburgh Malleable Iron Co., Pittsburgh, Pa.
Procian. See Northwestern Steel & Iron Corp.
Riverside Steel Casting Co., Jacobus Ave Kearney, N. J
Steyer Steel Castings Co., Milwaukee, Wis.

CEMENT, Commutator
Anenorlute. See Technical Products Co.
Commutator Companion. See Withington Div. of Marnot Co.
Conductalute. See Technical Products Co.
Early, Edward E., 1129 W. Fifth, N. W., Canton, O.
Fixkwick. See Technical Products Co.
Ideal Commutator Dresser Co., 1008 Park Ave., Sycamore, Ill.
Imperial. See Martindale Electric Co.
Martindale Elec. Co., 1262 W. Fourth, Cleveland, O.
Mitchell Rand Mfg. Co., 19 Vesey, New York, N. Y.
Perce-Lute. See Perfection Supply Co.
Perfection Supply Co., 98 Park Pl., New York, N. Y.
Plas Mica Co., 26 St. Andrews Place, Yonkers, N. Y.
Porce-Lute. See Perfection Supply Co.
Technical Products Co., (Sharpsburg Station) Pittsburgh.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa
Withington Div. of Marnot Co., 50 Thayer, Boston, Mass.

CEMENT, Liquid Porcelain
Anchorlute See Technical Products Co
Color-Bestos. See Technical Products Co.
Fire Lute. See Technical Products Co.
Insa-Lute. See Technical Products Co.
Marblute. See Technical Products Co.
Okonite Co., Passaic, N. J.
Patch-O-Namel. See Technical Products Co.
Repairet Mfg. Co. Milwaukee, Wis.
Stupakoff Laboratories, 5127 Hamilton Ave. Pittsburgh Pa
Technical Products Co., (Sharpsburg Station) Pittsburgh.
Thermoid. See Technical Products Co.
CHAIN, Chandelier (Fancy). See Crystals, Chandelier
CHAIN DRIVES. See Chain, Power Transmission.

CHAIN, Fixture
Acco. See American Chain Co.
American Chain Co., Bridgeport, Conn.
Chase Brass & Copper Co.
Eastern Chain Works, 309 E. 22nd St., New York, N. Y
Faries Mfg. Co. Decatur Ill.
Globe Metal Mfg. Co., Haggert & Emerald Sts., Philadelphia, Pa.
H. & O Chain Co., So. Norwalk, Conn.
Newark Metal Mfg. Co., 22 S. 6th, Newark, N. J.
Plume & Atwood Mfg. Co., Waterbury, Conn.
Steele & Johnson Mfg. Co., Waterbury, Conn.
Universal Metal Chain Co., 75 Clymer, Brooklyn, N. Y

CHAIN, Power Transmission
Baldwin Chain & Mfg. Co., Auburn, Mass.
Boston Gear Wks. Sales Co., Norfolk Downs, Mass.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Froiland Chain & Mfg. Co., Springfield, Mass.
Link-Belt Company, 910 S. Michigan Ave., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.
Ramsey Chain Co., Inc., Albany, N. Y.
Reeves Pulley Co., Columbus Ind
Renold Boston, See Boston Gear Wks.
Union Chain & Mfg. Co. Sandusky, O.
Whitney Mfg. Co., Hartford, Conn.

NEW CEMENT COMPOUND
IMPROVED MARBLUTE
Solves that Technical Cement Problem
Write for FREE SAMPLE
TECHNICAL PRODUCTS COMPANY
Makers of Insa-Lute Liquid Porcelain
Sharpsburg Station, Pittsburgh, Pa.

CHAIN, Socket
American Ball Chain Works, 12 Wooster St., New York.
Bead Chain Mfg. Co., Bridgeport, Conn.
H. & O. Chain Co., South Norwalk, Conn.
CHANDELIER BEADS. See Crystals, Chandelier.
CHANDELIER CRYSTALS. See Crystals, Chandelier.
CHANDELIER FRINGE. See Crystals, Chandelier.

CHARGERS, Magnet
Charging, Remagnetizing.
Colvin Corp., 6110 S. Main, Los Angeles, Cal.
Fore Elec. Mfg. Co., 4800 Delmar Ave., St. Louis, Mo.
Luma Elec. Equipment Co., Toledo, O.
Scintilla Magneto Co., Inc., Sidney, N. Y.
Valley Electric Co., 4221 Forest Park Blvd., St. Louis, Mo.

CHEMICALS, Battery
Electrolyte, Battery Salts, Battery Oxides, Sal Ammoniac, Bluestone, Manganese.
Cooper & Co., Charles, 194 Worth, New York, N. Y.
Elmer & Amend, 205 3rd Ave., New York, N. Y.
Electrex. See Goodyear Chemical Co., Inc.
Electro Chemical Co., 113 W. Court St., Dayton, O.
General Metallic Oxides Co., Jersey City, N. J.
Globe Chemical Co. Murray Rd. and Big Four R. R., (St. Bernard), Cincinnati, O.
Goodyear Chemical Co., Inc., 20 W. 22nd, New York, N. Y.
Grasselli Chemical Co., Guardian Bldg., Cleveland, O.
Kalbfleisch Corp., 200 5th Ave., New York, N. Y.
Klipstein & Co., 644 Greenwich, New York, N. Y.
Lightning Co., St. Paul, Minn.
Merrimac Chemical Co., 148 State, Boston, Mass.
Powers-Weightman-Rosengarten Co., Philadelphia, Pa.
Voltah. See Powers-Weightman-Rosengarten Co.
Wah Chang Trading Corp., 233 Broadway, New York, N. Y.

CHEMICALS, Refrigeration
Arctic. See Roessler & Hasslacher Chemical Co.
Calco Chemical Co., Bound Brook, N. J.
Carbide & Carbon Chemicals Corp., 30 E. 42nd, New York, N. Y. (Butane & Isobutane.)
Dry Ice Corp. of America, 50 E. 42nd New York, N. Y.
Roessler & Hasslacher Chemical Co., 709 Sixth Ave., New York, N. Y. (Methyl Chloride, Ethyl Chloride.)
Virginia Smelting Co., West Norfolk, Va. (Sulphur Dioxide.)
Chromium Plating. See Plating & Finishing.

CHUCKS, Magnetic
J & H Elec. Co., 200 Richmond, Providence, R. I.
Simmons. See Taft-Pierce Mfg. Co.
Taft-Peirce Mfg. Co., Woonsocket, R. I.
Walker Co., O. S. (Rockdale), Worcester Mass.

CIRCUIT BREAKERS
Air and Oil Circuit Breakers and Oil Break Switches.
Allen-Bradley Co., 493 Clinton, Milwaukee, Wis.
Anderson & Co., C. J., 212 W. Austin Ave., Chicago, Ill.
Anderson Mfg. Co., Albert & J. M., 289 A St., Boston, Mass.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Asco. See Automatic Switch Co.
Automatic Reclosing Circuit Breaker Co., Columbus, O.
Automatic Switch Co., 154 Grand, New York, N. Y.
Black & Decker Elec. Co., Kent, O.
Burkaw, Inc., 30 Court, Newark, N. J.
Burke Controller Co., 369 Lexington Ave., New York, N. Y.
Condit Elec'l Mfg. Corp., 842 Summer St. (South Boston), Boston Mass.
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee. (Mercury Type).
General Electric Co., Section W-329, Bridgeport, Conn.
Hartman Electrical Mfg. Co., 31 E. Fifth, Mansfield, Ohio.
Heinemann Electric Co., Penn Ave. & Plum, Trenton, N. J.
High Tension Elecl. Specialty Co., 500 Washington, Abington, Mass.
Hitesco. See High Tension Elecl. Specialty Co
H. & H. See Hart & Hegeman Div
Inducto-therm. See Allen-Bradley Co
I. T. E. Circuit Breaker Co., 19th and Hamilton Sts., Philadelphia, Pa.
Line Material Co., South Milwaukee, Wis. (Oil Switches.
Maple Co., R. H., 3156 Ruckle, Indianapolis, Ind.
Martindale Elec. Co., 1262 W. Fourth, Cleveland, O.
Minibraker. See Burke Controller Co.
Re-Cirk-It. See Heinemann Elec. Co.
Roller-Smith Co., 239 Broadway, New York, N. Y.
Sentinel. See Westinghouse Elec. & Mfg. Co.
Takamine Corp., 3510 36th Ave., Long Island City, N. Y.
Time-O-Stat Controls Co., Elkhart, Ind.
U-Re-Lite. See I. T. E. Circuit Breaker Co
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
CIRCUIT TESTERS. See Testers, Fuse and Circuit
CLEANER BAGS, Vacuum. See Bags, Vacuum Cleaner.
CLEANER BRUSHES, Vacuum. See Brushes for Vacuum Cleaners.

CLEANERS, Metal
Oakite Products, Inc., 26 Thames, New York, N. Y
CLIPS, Fuse. See Fuse Clips.

CLIPS, Heater Plug
Gray Bros., Inc., Plano, Ill.
CLOCK SWITCHES. See Switches, Time
CLOTH GEARS. See Gears and Pinions, Composition.
CLOTH LOUD SPEAKER DIAPHRAGM. See Cloth, Untreated.
CLOTH RADIO GRILL. See Cloth, Untreated.

CLOTH, Untreated
Boyle & Co., John, 112 Duane, New York, N. Y.
Canvas, "Aeroplane Cloth," Cotton Duck, Drill, Diaphragm Cloth, Grill Fabrics, etc
Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y.
Pindall Fabrics Corp., 200 Madison Ave., New York, N. Y. (Grill Cloth)
Walker Cotton Fabrics Co., 327 S. La Salle, Chicago, Ill.

Plastics of every description with deep, brilliant coloring—countless Hard Rubber Products with glowing lustre and pure black finish—here are materials that may solve your production problems. Our efficient staff is here to serve you.

PLASTICS in every conceivable form

MOULDERS since 1897

HARD RUBBER in every conceivable form

Joseph Stokes RUBBER CO.

TRENTON, N. J.

Look for the Mark of Quality

Canadian Factory: Welland, Ontario

KOILS BY KURMAN

"NOT A SHORTED TURN IN A KARLOAD"

THEY STAND UP

Kurman Engineering Corp.
Successors to Herald Electric Co
22-14 Fortieth Ave.
L. I. City, N. Y.
Phone STIllwell 4659

FINISH IT WITH ZAPON

THE very important part of the value we contribute to Zapon is the pioneering experience that has led to the present day highly perfected development of

PYROXYLIN LACQUERS

Motivated by the same spirit as the pioneers of covered wagon days, we have blazed every scientific trail leading to the highest degree of pyroxylin lacquer quality and uniformity. Every experimental test, every chemical process, all research and basic materials have been brought directly under the complete control of our laboratories.

As a result users of pyroxylin lacquers for every known purpose, the world over, are finding there is no substitute for Zapon. No approach to its leadership, no comparison as to its results, its satisfaction and economy.

Behind the use or specification of this product stands a reputation that has made Zapon "The acknowledged standard since 1884."

Regardless of what your finishing problem may be, the complete facilities of our service laboratory are constantly at your disposal without cost. Let this scientific knowledge and experience aid you in the more practical and economical solution of your problem. We invite your inquiries.

THE ZAPON COMPANY
STAMFORD, CONN.
Subsidiary of Atlas Powder Company

THE RECOGNIZED STANDARD OF QUALITY SINCE 1884

Veriflex

Flexibility is the essential in Good Heater cord . . . It is the basis of Driver-Harris Central Station Grade.

Write for booklet "How to Judge Heater Cord."

Driver-Harris Company
Harrison, New Jersey

MEISSNER
QUALITY
COILS
COIL WINDING MACHINERY
MEISSNER
520 S. Clinton St., Chicago, U.S.A.

CLOTH, WIRE
(For Radio Tube Screens)
Buffalo Wire Works Co., 585 Terrace, Buffalo, N. Y.
Newark Wire Cloth Co., 351 Verona Ave., Newark, N. J.
Sealedged. See Newark Wire Cloth Co.

CLOTH AND PAPER, Insulating

Cloth, Insulated ..... See C
Paper, Insulated ..... See P
Fibre Paper (Fish Paper) ..... See F
Press Board (Fuller Board) .... See B
Silk ..... See S

Acme Wire Co., New Haven, Conn. ..... C B P
Armco. See Rogers Paper Mfg. Co.
Armatite. See Mica Insulator Co.
Behr-Manning Corp., Troy, N. Y. ..... P
Brand & Co., Wm., 288 4th Ave., New York. .... P
Campbellite. See National Vulcanized.
Carboloid Products Corp., 98 Front, Brooklyn, N. Y. ..... C P
Chase Brothers, Inc., Highland, Park, Conn. .... P B
Case Mfg. Co., Unionville, Conn. ..... P
Case & Risley Press Paper Co., Oneco, Conn. .....
Cellma. See Tarentum Paper Mills Co.
Celoron Co., Div. of Continental Diamond Fibre Co., Bridgeport, Pa. ..... P F B
C-P. See National Vulcanized Fibre Co.
Columbian Rope Co., Auburn, N. Y. ..... P
Continental-Diamond Fibre Co., Newark, Del. .... P
Consumers Rubber Co., 1302 Ontario, N., Cleveland, O. ..... P
Coruco. See Consumers Rubber Co.
De Jonge & Co., Louis, 69 Duane, New York, N. Y. (Condenser). ..... P
Dexstar. See Dexter & Sons.
Dexter & Sons C. H., Windsor Locks, Conn (Condenser Tissue.) ..... P
Dielectric Mfg Co., St. Louis, Mo. ..... C B P
Electra. See Tarentum Paper Mills Co.
Electrite. See West Virginia Pulp & Paper Co.
Fyberoid See Wilmington Fibre Specialty Co.
General Electric Co., Section W-329 Bridgeport, Conn. ..... C P
Hartford City Paper Co., Hartford City, Ind. (Glassine Condenser Tissue).
Hewitt & Bros., C. B., 16 Ferry, New York C P
Hi-Tex See Stevens Paper Mills.
Hollingsworth & Vose Co., 333 Washington, Boston, Mass. ..... P
Incelia See Tarentum Paper Mills Co.
Insuline Corp. of America, 78 Cortlandt, New York, N. Y. ..... F
Lamicold. See Mica Insulator Co.
Manning Paper Co., J. A., Troy, N. Y. ..... B
Mica Insulator Co., 200 Varick, New York C B P B
Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y. ..... C B P F B
National Vulcanized Fibre Co., Wilmington, Del. ..... F
New Jersey Wood Finishing Co., Amboy Ave., Woodbridge, N. J. C
Ohmoid. See Wilmington Fibre Specialty Co.
Old Hick. See Hewitt & Bros., C. B.
Pearlsea See National Vulcanized Fibre Co.
Riegel Paper Corp., 342 Madison Ave., New York, N. Y. ..... P
Rogers Paper Mfg. Co., So. Manchester, Conn. ..... B
Schweitzer, Inc., Peter J., 200 Fifth Ave., New York, N. Y. (Condenser Tissue.)
Sico. See Standard Insulation Co.
Spaulding Fibre Co., Tonawanda, N. Y. ..... F
Standard Insulation Co., East Rutherford, N. J. ..... C B P
Sterling Fireboard Co., 501 Fifth Ave., New York. (Varised Hard Fireboard) ..... B
Sterlite. See Sterling Firebrand Co.
Stevens Paper Mills, Windsor, Conn. ..... B
Tarentum Paper Mills Co., Tarentum, Pa. .... P
Turbonite See Brand & Co., Wm.
Union Mills Paper Mfg. Co., New Hope, Pa. .... P
West Virginia Pulp & Paper Co., 230 Park Ave., New York ..... B
Wilmington Fibre Specialty Co., Wilmington, Del. ..... P

CLUTCHES, Magnetic
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee, Wis

COIL (Coils).
Armature and Field. See Coils, Finished.
Choke (Radio). See Radio Circuit Components.
Driers & Impregnators. See Ovens.
Electromagnet. See Coils, Finished.
Flattening. See Rolls, Coil Flattening.
High Frequency. See Electro-Therapeutic; also Radio Circuit Components; also Ignition Outfits.
Impregnators, Vacuum. See Ovens, Industrial.
Induction. See Coils, Finished; also Electro-Therapeutic.
Loop Benders. See Benders, Coil Loop.
Medical. See Electro-Therapeutic.
Presses. See Presses, Armature Coil.
Radio. See Radio Circuit Components.
Removers. See Removers, Coil.
Resistance. See Units, Rods & Grids; also Radio Circuit Components.
Spark. See Ignition Outfits.
Spreaders. See Winding Machines, Armature and Field.
Tamping Tools. See Tools, Coil Tamping.
Taping Machines. See Taping Machines, Coil.
Testers. See Testers, Coil; also Test Benches, Armature
Winders. Armature & Field Coil. See Winding Machines Armature & Field Coil.
Winders. Induction Coil. See Winding Machines, Induction Coil
Winding Forms See Forms, Coil Winding

Windings (Magneto). See Coils, Finished.
Wire Tension Devices. See Tension Devices, Coil Wire

COILS, Finished
Armature, Field, Electromagnet and Induction Coils.
Acme Wire Co., New Haven, Conn.
Aero Products, Inc., 4611 Ravenswood Ave., Chicago, Ill.
Anderson & Co., C. J., 213 W. Austin Ave., Chicago, Ill.
Armature Co., 7500 Stanton, Cleveland, Ohio
Auth Electrical Specialty Co., 422 E. 53rd St., New York.
A. & A. See Electrical Coil Winding Co.
Belden Mfg. Co., 4633 W. Van Buren, Chicago, Ill.
Bunnell & Co., J. H., 215 Fulton, New York, N. Y.
Burke Controller Co., 869 Lexington Ave., New York, N. Y.
Chattanooga Armature Wks., Chattanooga, Tenn.
Coils, Inc., 1183 Eddy, Providence, R. I.
Concourse Electric Co., 292 E. 137th, New York, N. Y.
Dumar Elec. Co., Brookline, Mass.
Easton Coil Co., Bushkill Pike, Easton, Pa.
Electric Heat Control Co., 5902 Carnegie Ave., Cleveland, O.
Electric Valve Mfg. Co., 64 Murray, New York, N. Y.
Electrical Coil Winding Co., 2735 Saunders, Camden, N. J.
General Cable Corp., 420 Lexington Ave., New York, N. Y.
Globe Technolian Corp., Reading, Mass.
Inca Mfg. Co., Fort Wayne, Ind.
Kurman Engineering Corp., 22-14 40th Ave., Long Island City.
Marion Elec. Mfg. Co., 24 Cliff, Jersey City, N. J.
Melsaac Mfg. Co., 520 S. Clinton, Chicago, Ill.
Mignon Elec. Corp., 909 Genesee, Buffalo, N. Y.
National Armature & Elec. Works, Bluefield, W. Va.
National Elec. Corp., 226 High, Newark, N. J.
Palmer Corp., Chas., 786 Broad, Newark, N. J. (Solenoids.)
Polymet Mfg. Corp., 829 E. 134th St., New York, N. Y.
Power Transformer Co., 145 W. 22nd, New York, N. Y.
Reifsnyder Mfg. Co., W. H., Hagerstown, Md.
Robertson-Davis Co., 363 W. Superior, Chicago, Ill.
Robertson, Leo F., Inc., 532 West 22nd St., New York.
States Co., 19 New Park Ave., Hartford, Conn.
Stuns & Barron, 210 E. Pratt, Baltimore, Md.
Toledo Standard Commutator Co 2342 Smead Ave., Toledo, O
Universal Armature Corp., Cambridge, Mass.
Varley Duplex Magnet Co., 15 Exchange Place, Jersey City, N. J. (Electromagnetic only).
Wheeler Insulated Wire Co., Bridgeport, Conn.

COILS, Honeycomb. See Radio Circuit Components.

COMMUTATOR
Bars. See Bars, Commutator.
Cement. See Cement, Commutator.
Dressers. See Stones, Commutator.
Lubricants. See Compounds, Commutator.
New. See Commutators.
Refilled. See Repairing and Second Hand.
Slotters. See Slotting Machines & Tools, Commutator
Slotting Files. See Files, Commutator Slotting.
Soldering Machines. See Soldering Machines, Commutator
Stones. See Stones, Commutator.
Tighteners. See Tightening, Commutator.
Truing Devices. See Tools, Commutator Truing.

COMMUTATORS
Armature Co., 7500 Stanton Ave., Cleveland, Ohio.
Cameron Electric Mfg. Co., Ansonia, Conn.
Cleveland Commutator Co., 1882 E. 55th, Cleveland, O.
Derby Commutator Co., Derby, Conn.
Electric Materials Co., North East, Pa.
Eureka Elec. Equip. Co., 91 Clay, North East, Pa.
Homer Commutator Co., 4748 Hough Ave., Cleveland.
Toledo Standard Commutator Co., Toledo, O.

COMMUTATOR BRUSHES. See Brushes, Commutator.
COMPOSITION PULLEYS. See Pulleys, Composition.

COMPOUNDS, Commutator
Allen Co., Inc., L. B., 6752 Bryn Mawr Ave., Chicago, Ill.
Armstrong. See Elec. Power Maintenance.
Chicago Solder Co., 4201 Wrightwood Ave., Chicago, Ill.
Commutone. See Warren Lubricant Co.
Cramolin, Inc., 25 W. 43rd St., New York, N. Y.
Dixon Crucible Co., Jos., Monmouth, Jersey City, N. J.
Doe & Co., Walter S., Kent, Ohio.
Electric Power Maintenance Co., 21 N. Third, Minneapolis
Goldmark Co., James, 83 Warren, New York, N. Y.
Kester Solder Co., 4210 Wrightwood Ave., Chicago, Ill.
Perfection. See Warren Lubricant Co.
Sanderson. See Warren Lubricant Co.
Spermo. See Warren Lubricant Co.
Trotters. See Goldmark Co., James.
Warren Lubricant Co., 22 Maurice, Buffalo, N. Y.

COMPOUNDS, Sealing. See Wax and Compounds.

CONDENSER UNITS, Refrigerator
Bush Mfg. Co., Hartford, Conn.
McCord Radiator & Mfg. Co., Riopelle & E. Grand Ave., Detroit, Mich.
Rome-Turney Radiator Co., Rome, N. Y.
Wolverine Tube Co., 1431 Central Ave., Detroit, Mich.

CONDENSER, Electric
Fast & Co., John E., 3123 N. Crawford Ave., Chicago, Ill.
Sevison Magneto Engineering Co., 379 Phillips Ave., Toledo.

CONDENSERS, Radio. See Radio Circuit Components.
CONDENSER TUBING. See Tubing, Brass and Copper

CONNECTORS, Wire
Ideal Commutator Dresser Co., 1008 Park Ave., Sycamore, Ill. (Solderless-Tapeless).

CONTACT POINTS. See Points, Contact.
CONTAINERS, Shipping. See Fibre Board Products.

CONTROLLERS, Motor
Adlinestor. See Sundh Elec. Co.
Allen-Bradley Co., 493 Clinton, Milwaukee, Wis.
Anderson & Co., C. J., 213 W. Austin Ave., Chicago, Ill.
Asco. See Automatic Switch Co.
Automatic Switch Co., 154 Grand, New York, N. Y.
Betts, Inc., James H., 1393 Sedgwick Ave., New York, N. Y. (Traffic.)
Burkau, Inc., 30 Court, Newark, N. J.
Burke Controller Co., 869 Lexington Ave., New York N. Y.
B-O Oil Burner Co., 324 S. California Ave., Stockton, Cal.
Clark Controller Co., 1146 E. 152nd, Cleveland, O.
Condit Elec'l Mfg. Corp., 842 Summer (South Boston) Boston, Mass.
Cutler-Hammer Mfg. Co., 1288 St. Paul Ave., Milwaukee.
Diamond Elecl. Mfg. Co., 1330 N. 16th, Los Angeles, Cal.
Dinkey. See Elec. Controller & Mfg. Co.
Dunco. See Struthers Dunn, Inc.

COILS
Electrical Windings of all Kinds
Let our engineers help you
ROBERTSON-DAVIS CO.
363 W. Superior St. Chicago, Ill.

CONDENSERS

Sevison Magneto Engineering Co.
379-401 Phillips Ave. Toledo, Ohio

E C & M Youngstown. See Electric Controller & Mfg. Co.
Electric Controller & Mfg. Co., 2700 E. 79th, Cleveland, O.
Electrite. See Sundh Elec. Co.
General Electric Co., Schenectady, N. Y.
Hercules. See Union Elec. Mfg. Co.
Horni Signal Mfg. Corp., 515 Greenwich, New York.
Industrial Controller Div. of Square D Co., S. Pierce & Hanover Sts., Milwaukee, Wis.
Maimin Speed Control Corp., 251 W. 19th, New York. (Sewing Machines.)
Monitor Controller Co., 51 Gay, Baltimore, Md.
National Electric Controller Co., 5315 Ravenswood Ave., Chicago, Ill.
Refrigerating Specialties Co., 728 S. Sacramento Blvd., Chicago, Ill.
Resisto. See Allen-Bradley Co.
Rowan Controller Co., 306 N. Holliday, Baltimore, Md
Square D Co., Detroit, Mich.
Struthers Dunn, Inc., 138 N. Juniper, Philadelphia, Pa.
Sundh Elec. Co., 209 Parkhurst, Newark, N. J.
Switchotone. See Condit Elec. Mfg. Co.
Thermaload. See Monitor Controller Co.
Trumbull Electric Mfg. Co., Plainville, Conn.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
W. K. See Westinghouse Elec. & Mfg. Co.
Wright. See Electric Controller & Mfg. Co.

COPPER. See Brass, Bronze and Copper; also Castings
COPPER TUBING. See Tubing, Brass and Copper
CORD TIPS. See Tips, Cord.
CORD, Tinsel. See Tinsel Cord & Thread.

CORDS, Extension
Stupakoff Laboratories, 6627 Hamilton Ave., Pittsburgh, Pa.

CORES, RESISTANCE COIL (Lava)
American Lava Corp., 1425 William, Chattanooga, Tenn.
Crescent. See M. Kirchberger & Co.
Ex-El-Co. See Southern Lava Co.
Kirchberger & Co., M., 1425 37th, Brooklyn, N. Y.
Lavite. See Steward Mfg. Co.
Lavarock. See M. Kirchberger & Co.
Southern Lava Co., Rossville, Ga.
Steward Mfg. Co., D. M., Chattanooga, Tenn.
Tennessee Burner Mfg. Co., Chattanooga, Tenn.
XL. See Tennessee Burner Mfg. Co.

CORES, RESISTANCE COIL (Refractory Porcelain)
American Lava Corp., 1425 William, Chattanooga, Tenn.
Colonial Insulator Co., Akron, O.
Cook Pottery Co., Trenton, N. J.
Crowley & Co., Henry L., 1 Central Ave., West Orange, N. J.
Electrical Refractories Co., 50 Clark, East Palestine, O.
Elemite. See Louthan Mfg. Co.
Firelte. See Hartford Faience Co.
Hartford Faience Co., Hartford, Conn.
Louthan Mfg Co., E. Liverpool, O.
Star Porcelain Co., Trenton, N. J.
Stupakoff Laboratories, 6627 Hamilton Ave., Pittsburgh, Pa.
Thermorock. See Cook Pottery Co.
Thermal Syndicate, 58 Schenectady Ave., Brooklyn, N. Y.
Vitrecail. See Thermal Syndicate.

COTTON DUCK. See Cloth, Untreated.
COTTON SLEEVING. See Tape, Cotton.
COUNTERS, Revolution. See Tachometers

COUPLINGS, Shaft (Flexible-Insulated)
Ajax Flexible Coupling Co., Westfield, N. Y.
Bartlett Hayward Co., Scott & McHenry, Baltimore, Md.
Bond Co., Charles, 617 Arch, Philadelphia, Pa.
Brown Engineering Co., 123 N. Third Reading Pa.
Chicago Gear Works, 769 W. Jackson Blvd., Chicago, Ill.
Falk Corp., Milwaukee, Wis.
Delbee Rubber Co., Syracuse, N. Y.
Francke. See Smith & Serrell.
General Electric Co., Schenectady, N. Y.
Grundy. See Bond Co.
Hill Clutch Machine & Foundry Co., 6400 Breakwater Ave., Cleveland, Ohio.
Kanti Lever. See Brown Engineering Co.
Kruse-Seebek Die Casting & Mfg. Co., 2935 W. 47th, Chicago, Ill.
Lovejoy Tool Wks., 325 W. Ohio, Chicago, Ill.
LR. See Lovejoy Tool Wks.
Mather. See Bond Co.
Nuttall Wks., of Westinghouse Elec. & Mfg. Co., McCandless Ave. & Harrison St., Pittsburgh, Pa.
Oneida. See Delbee Rubber Co.
Smith & Serrell, 5 Halsey, Newark, N. J.
Webster Mfg. Co., 1858 N. Kostner Ave., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

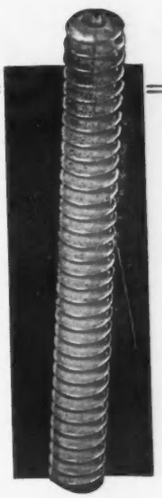
COVERING MACHINES, WIRE. See Wire Manufacturing Machines.

COVERS, Paper and Fabric
For Lamp Shades, Paper & Fabric, Fans, Radio & Appliances.
Adjusto. See Phoenix Import Co.
Arkel Safety Bag Co., 10 E. 40th St., New York, N. Y. (For Motors, Fans, Lamp Shades.)
Boyle Co., John, 121 Duane, New York, N. Y. (Fan.)
Droutman Mfg. Co., 36 W. 20th, New York, N. Y.
Empire Shield Co., 590 Broadway, New York, N. Y.
Kennedy Car Liner & Bag Co., Shelbyville, Ind.
Lansing Sales Co., 24 Harvard, Boston, Mass.
La Rose Mfg. Co., 757 Sixth Ave., New York, N. Y. (Rubberized Fan.)
Phoenix Import Co., 45 E. 25th, New York, N. Y. (Shade.)
Superb. See Droutman Mfg. Co.
Superior. See Empire Shield Co.

CRUCIBLES, Porcelain. See Porcelain.
CRANES, Floor. See Lifts, Armature.

Porcelava

The best for Electric Heating Appliances



Our clay specialties, plain and threaded tubes, and Refractory Porcelain for Electric Heating Appliances are superior in every way; and "PORCELAVA" makes the best Pyrometer Insulation.

Burgess & Company
East Liverpool, Ohio
Factory at Wellsville, O

Chicago Representative:
F. D. FARNAM & CO
353 No. Wells St., Chicago, Ill

PORCELAIN *by* AKRON

WE do not offer ONE grade of porcelain to fill every requirement.

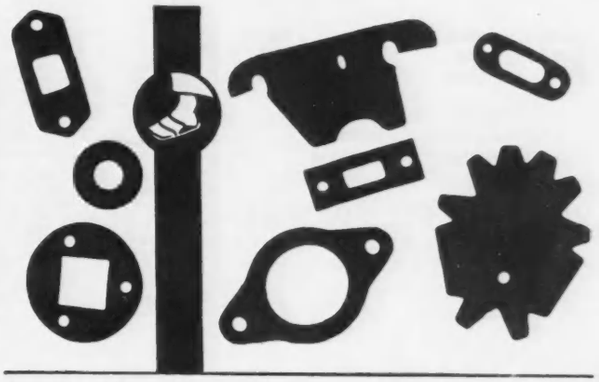
After many years of engineering and research work we have produced a number of porcelain compounds.

In our new factory equipped "up-to-the-minute," we can produce porcelain to fill your individual requirements—and at minimum cost.

Send us drawings of your special porcelain pieces, stating your needs. We may be able to offer you something interesting.

The answer to exacting requirements

THE AKRON PORCELAIN CO.
Akron, Ohio
Specialists in Porcelain



VERSATILE FELT

The American Felt Company, largest Felt manufacturers in the world, would welcome an opportunity to cooperate with your engineers. Daily, hundreds of difficult engineering and manufacturing problems are being solved by the intelligent use of Felt.

We are equipped to supply Felt in bulk or cut to the most exacting specifications. And once your order is placed, your worries cease —for your production schedule will be faithfully complied with.

Don't delay—investigate this most versatile of all products.

American Felt Company

BOSTON SAN FRANCISCO NEW YORK
DETROIT CHICAGO
PHILADELPHIA ST. LOUIS

AMERICAN FELT CO.
315 Fourth Ave., N. Y. C.

We are interested in the use of felt.
Send sample for.....

☐ Have your representative call.

Name .....

Address .....

.....

FELT

Wicks for Motors
Lining for Fan Bases
Lining for Lamp Bases
Packing for Radio Trade

WESTERN FELT WORKS
4029-4133 Ogden Ave., Chicago
NEW YORK DETROIT CLEVELAND ST. LOUIS

CRYSTALS, Chandelier
Crystals, Prisms, Beads, Chains, Fringes.
Crystal Venezia. See Harrison & Co., Arthur.
Foelite. See Harrison & Co., Arthur.
Friedlaender Co., 49 W. 23rd, New York, N. Y.
Harrison & Co., Arthur, 561 W. Washington Blvd., Chicago.
Hirschberg, Shutz & Co., 268 4th Ave., New York, N. Y. (Fringes.)
Nelson Read Co., 15 W. 37th, New York, N. Y. (Importer.)
Rialto Import Co., 112 W. 44th, New York, N. Y.
Schwartz Lighting Fixture Wks., 1341 Noble, Philadelphia.
Wyle & Bros., J. J., 20 E. 27th, New York, N. Y.

CUPS, Grease
Gits Bros. Mfg. Co., 1940 S. Kilbourn Ave., Chicago, Ill.
Lunkenheimer Co., Cincinnati, Ohio.

CUPS, Oil
Gits Bros. Mfg. Co., 1940 S. Kilbourn Ave., Chicago, Ill.
Tucker, Inc., W. W. & C. F., 618 Capital Ave., Hartford, Conn.

CUT OUTS, Battery. See Switches, Battery.
CUTTING OUTFITS, Metal. See Welding and Cutting Outfits.
CURRENT INDICATORS. See Instruments, Pocket.
DASHBOARD METERS. See Instruments, Portable and Switchboard.

DECALCOMANIA
Meyercord Co., Chicago, Ill.
Novar. See Palm Fechteler & Co.
Palm Fechteler & Co., 67 5th Ave., New York, N. Y.

DIALS
Radio (Metal). See Radio Mountings.
Radio (Molded). See Radio Molded Parts.
Enameled. See Dials, Enameled.

DIALS, Enameled
Cooper Oven Thermometer Co., Pequabuck, Conn.

DIAPHRAGM, Cloth. See Cloth, Untreated.
DIE CASTINGS. See Castings, Die.

DIE CASTING MACHINES
Allied Die Casting Corp., 43rd Ave. from 38th to 39th, Long Island City, N. Y.
Madison-Kipp Corp., 211 Waubesa, Madison, Wisc.

DIE MAKERS. See Dies, Die Makers.

DIE SETS
Baumbach Mfg. Co., 1810 Kilbourn Ave., Chicago, Ill.
Danly Machine Specialties, Inc., 2104 S. 52nd Ave., Chicago, Ill.
Diamant Tool & Mfg. Co., 401 Mulberry, Newark, N. J.

DIES, Pipe. See Stocks, Dies and Reamers.

DIES, DIE MAKERS
Beaver Mfg. Co., 625 N. Third, Newark, N. J.
Caldbeck Tool & Mfg. Co., 307 East Third, Des Moines, Iowa.
Chicago Molded Products Co., 2148 Walnut, Chicago, Ill.
Eureka Tool & Machine Co., 42 Walnut, Newark, N. J.
Kuhn & Jacob Machine & Tool Co., 502 Prospect Ave., Trenton, N. J.
Madison-Kipp Corp., 211 Waubesa, Madison, Wis.
Mareck & Nebel, 255 Greenwich, New York, N. Y.
Stein & Co., Wm. P., 424 St. Paul, Rochester, N. Y.

DIMMER, Theatre
Ward Leonard Elec. Co., Mt. Vernon, N. Y.

DISCS, Armature
Steel Discs, Laminations, and Segments for Motors and Transformers.
Alleghany Steel Co., Brackenridge, Pa.
American Stamping Co., 978 E. 64th, Cleveland, O.
Armature Co., 7500 Stanton Ave., Cleveland, O.
Cleveland Armature Works, 4732 St. Clair Ave., Cleveland
Hercules Elec. Steel Corp., 145 Lafayette, New York, N. Y.
Johnson, H. D., 170 Mahncke Court, San Antonio, Texas
Niagara Machine & Tool Wks., 637 Nortland, Buffalo, N. Y.
Willor Mfg. Corp., 117 Mercer, New York, N. Y.

DRAWING MACHINES, WIRE. See Wire Drawing Mach.
DRIVE SCREWS. See Screws, Drive.
DRIVES, CHAIN. See Chain, Power Transmission.

DYNAMOMETERS
Clark Controller Co., 1146 E. 152nd, Cleveland, O.
Diehl Mfg. Co., Elizabeth, N. J.
General Electric Co., Schenectady
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

EBONITE. See Rubber, Hard.
ELECTROLYTE. See Chemicals, Battery.
ELECTROMAGNETS. See Coils, Finished.

ELECTRODES FOR GAS SIGNS
American Neon Sign Corp., 549 W. 132nd St., New York.
American Sign Co., Cincinnati, Ohio.
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
Q. R. S. De Vry Corp., 333 N. Michigan Ave., Chicago.

ELECTRODYNAMOMETERS. See Instruments, Laboratory Standard.

ELECTRO MAGNETS
Varley Duplex Magnet Co., 15 Exchange Pl., Jersey City, N. J.

ELEMENTS, Heating. See Units, Rods and Grids.

ENAMELING MACHINES (For Magnet Wire)
(See Also Wire Manufacturing Machines).
American Insulating Machinery Co., 519 Huntington Ave. Philadelphia, Pa.
Sleeper & Hartley, Inc., 335 Chandler, Worcester, Mass

ENGRAVING MACHINES
Portable Bench and Pedestal Outfits for Marking Metal.
Deckel. See Preis & Co., Inc., H. P.
Eisler Electric Corp., 770 S. 13th, Newark, N. J. (Tube Base Branders)
Engravograph Corp., 12 Vestry, New York, N. Y.
Etchograph. See Brewster Co., Wm.
Gilbert Supply Co., Independence, Iowa.
Gorton Machine Co., Geo., Racine, Wis.
Luma Elec. Equipment Co., Toledo, O.
Preis & Co., Inc., H. P. 227 Fulton, New York, N. Y.
Schmidt, Inc., Geo. T. 4102 Ravenswood Ave., Chicago, Ill.
Simplex Tool Co., Woonsocket, R. I.

ENGRAVING, Radio Panel
Engraving to Order.
Etch-O-Gravure. See Insuline Corp. of America.
General Fabricating Co., 165 Greenwich, New York, N. Y.
Globe Mfg. Co., 101 Spokane St., Seattle, Wash.
Insuline Corp. of America, 78 Cortlandt, New York, N. Y.
Mechanical Engraving Co., 130 Orchard, Newark, N. J.
Preis & Co., Inc., H. P., 227 Fulton, New York, N. Y.
Schmidt, Inc., Geo. T., 4102 Ravenswood Ave., Chicago, Ill. (Tube Base Branders).
Schwenke Machine Engraving Co., 2036 Woodward Ave., Detroit, Mich.
Verichrome Laboratories, 4614 Spring Grove Ave., Cincinnati
Wright Radio Co., 114 Exchange, Rockland, Mass.

ESCUTCHEONS, Radio. See Radio Mountings.

EYELETS
Monowatt Electric Corp., 24 W. 40th, New York, N. Y.
Platt Bros. & Co., Waterbury, Conn.
Waterbury Button Co. (Elecl. Mfg. Dept.), Waterbury, Conn.

FABRIC, Radio Grill. See Cloth, Untreated.
FABRIC SHADES. See Shades, Fabric.
FAN BLADES. See Blades, Fan
FAN GUARDS. See Forms, Wire.

FEET, Felt
Brawley Felt Co., Inc., T. R., 279 20th, Brooklyn, N. Y.
Mattatuck Mfg. Co., Waterbury, Conn.

FELT
American Felt & Cutting Co., 509 W. Lake, Chicago, Ill.
American Felt Co., 315 Fourth Ave., New York, N. Y.
Booth Felt Co., 460 18th, Brooklyn, N. Y.
Brawley Felt Co., Inc., T. R., 279 20th, Brooklyn, N. Y.
Western Felt Wks., 4029 Ogden Ave., Chicago, Ill.

FERRULES
Aluminum Co. of America, 2444 Oliver Bldg., Pittsburgh.
Chase Brass & Copper Co., Waterbury, Conn.
Clark Metal Products, 490 Hancock Ave., Bridgeport, Conn.
Grammes & Sons, Inc., L. F., Allentown, Pa.
Massachusetts Machine Shop, Inc., Boston, Mass.
Monowatt Elec. Corp., 2 W. 40th, New York, N. Y.
Patton-MacGuyer Co., Providence, R. I.
Platt Bros. & Co., Waterbury, Conn.
Risdon Mfg. Co., Naugatuck, Conn.
Scovill Mfg. Co., 99 Mill, Waterbury, Conn.
Waterbury Brass Goods Corp., Waterbury, Conn.
Waterbury Button Co. (Elecl. Mfg. Dept.), Waterbury, Conn.

FIBRE BOARD PRODUCTS (Solid and Corrugated)
Container Corp. of America, 111 W. Washington, Chicago. Chicago, Ill.
West Virginia Pulp & Paper Co., 230 Park Ave., New York, N. Y.

FIBER CANDLES. See Candles, Fixture.
FIBRE GEARS. See Gears and Pinions, Composition.
Paper. See Cloth and Paper.
Radio Panels. See Radio Molded Parts.
Shipping Containers. See Fibre Board Products.
Vulcanized. See Fibre, Vulcanized.

FIBRE, Phenol
Moisture Proof; Sheet, Rod, Tubes.
Aico. See American Insulator Corp.
Armite. See Spaulding Fibre Co.
Bakelite-Dilecto. See Continental Fibre Co.
Conite. See Continental-Diamond Fibre Co.
Continental-Diamond Fibre Co., Newark, Del.
Electrical Insulation Corp., 308 W. Washington, Chicago, Ill.
Formica Insulation Co., 4638 Spring Grove Ave., Cincinnati, O.
Franklin Fibre Specialty Co., Wilmington, Del.
Micarta. See Westinghouse Elec. & Mfg. Co.
National Vulcanized Fibre Co., Wilmington, Del.
Phenolite. See National Vulcanized Fibre Co.
Spaulding Fibre Co., Tonawanda, N. Y.
Synthane Corp., Oaks, Pa.
Textolite. See Electrical Insulation Corp.
Vul-Cot. See National Vulcanized Fibre Co.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

FIBRE, Vulcanized
Sheet, Rod, Tube, Horn, Fibre, Bushings, Washers, Cleats, Screw Machine Products.
Armite. See Spaulding Fibre Co.
Brandywine Fibre Products Co., 1402 Walnut St., Wilmington, Del.
Conite. See Continental-Diamond Fibre Co.
Continental-Diamond Fibre Co., Newark, Del.
Diamond F. See Continental-Diamond Fibre Co.
Delaware Hard Fibre Co., Box 970M, Wilmington, Del.
Egyptian. See Delaware Hard Fibre Co.
Electrosote. See Pantasote Co.
Fibre Products Co., New Bedford, Mass.
Franklin Fibre Specialty Co., Wilmington, Del.
Fyberoid. See Wilmington Fibre Specialty Co.
Insuline Corp. of America, 78 Cortlandt, New York, N. Y.
Iten Fibre Co., 5403 Bower Ave., Cleveland, O.
Lincoln Fibre & Specialty Co., Newport, Del.
National Vulcanized Fibre Co., Wilmington, Del.
Ohmoid. See Wilmington Fibre Specialty Co.
Pantasote Co., Inc., 250 Park Ave., New York, N. Y.
Peerless. See National Vulcanized Fibre Co.
Spaulding Fibre Co., Tonawanda, N. Y.
Vul-Cot. See National Vulcanized Fibre Co.
Vulcawood. See Continental-Diamond Fibre Co.
Wilmington Fibre Specialty Co., Wilmington, Del.

FIBRE WASHERS. See Fibre.
FIELD COILS. See Coils, Finished.

Electro Magnets

VARLEY DUPLEX MAGNET CO.
15 Exchange Pl., Jersey City, N. J.

FIBRE—*cut to any form*
Sheet, Rod, Tubing
MICA
VARNISHED CLOTH
COTTON TAPES AND SLEEVING
Everything for the Motor
Send for New Insulation Catalogue
THE CONSUMERS RUBBER CO.
CLEVELAND 1302-4-6 Ontario St.
CHICAGO 217 North Desplaines St.

FILAMENTS, Incandescent Lamp
Callite Products Co., 534 39th, Union City N. J. (Lead In.)
Conn, Sigmund, 44 Gold, New York, N. Y.
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
Filament Supply Co., 1317 Willow Ave., Hoboken, N. J.
Gilby Wire Co., Riverside Ave., Newark, N. J.
National-Harris Wire Co., Newark, N. J.
Newark Radio Laboratories, 50 Columbia, Newark, N. J.
Pierce Mfg. Co., 625 W. Jackson Blvd., Chicago, Ill.
Radio Products Corp., Steneck Trust Bldg., Hoboken, N. J.
Volkmer Radio Products Corp., 187 Sylvan Ave., Newark, N. J. (Lead-in-Welds.)
Welcon Industries, Inc., Exton Ave. & Buch, North Arlington, N. J. (Lead-in Welds.)

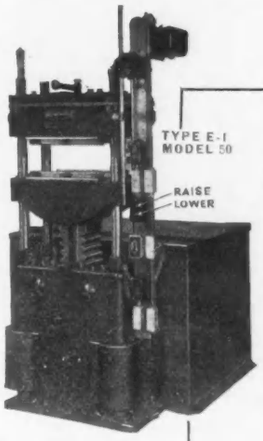
FILES, Commutator Slotting
Ideal Commutator Dresser Co., 1039 Park Ave., Sycamore, Ill.
Martindale Electric Co., 1262 W. Fourth, Cleveland, O.

FISH PAPER. See Cloth and Paper.
FITTINGS, Fixture. See Fixture Fittings.
FIXTURE CANDLES. See Candles, Fixture.
FIXTURE CHAIN. See Chain, Fixture.
FIXTURE, Collars. See Fixture Fittings.

FIXTURE FITTINGS

	KEY
Bow) Holders	See B
Brass Fittings	See B
Canopies	See B
Collars	See B
Crow Feet	See I
Finials (Brass, Glass and Porcelain)	See B
Hangers	See H
Hickies, Brass	See B
Hickies, Iron	See I
Hooks, Brass	See B
Hooks, Iron	See I
Iron Fittings	See I
Loops, Brass	See B
Loops, Iron	See I
Rings	See B
Shade Holders	See S
Shells	See B
Spinnings	See B
Stampings	See B
Stems	See B
Straps	See H
Studs	See I

Acme Lighting Products, Inc., 2114 Woodland Ave., Cleveland, O. "traps. . . . . H
American Chain Co., Bridgeport, Conn. (Loops and Rings.) . . . . . B . . . .
American Ring Co., Waterbury, Conn. (Candle.) . . . . S . .
Appleton Electric Co., 1703 Wellington Ave., Chicago, Ill. . . . . B I . . . .
Arco See American Ring Co.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn. . . . . S . .
Artoloid. See Great Eastern Brass Wks., Inc.
Art Metal Co., 3721 Dayton, Cleveland, O. . . . . H
Banlite. See East Side Metal Spinning Co.
Banner. See Plume & Atwood Mfg. Co.
Barton Brass Wks., 3627 Superior, Detroit. . B . . . . .
Belmet. See B. & L. Metal Stamping Co.
Bloch Bros., 88 Walker, New York. . . . . B . . . . .
Brandt Mfg. Co., 3727 Gratiot Ave., Detroit. B . . . . .
Braun, J. G., 609 S. Paulina, Chicago, Ill. (Pressed Ornaments.) . . . . . B I . . . .
Bryant Elec. Co., 1421 State, Bridgeport, Conn. . . . S . .
B. & L. Metal Stamping Co., 250 Moore, Brooklyn, N. Y. (Also Combination Wall Bracket Hanger.) . . . . . B I . . H
Cambridge Brass Co., Cambridge, Mass. . . . . B . . . . .
Chase Brass & Copper Co., Waterbury, Conn. B . . S . .
Chatham Metal Spinning & Stamping Corp., 123 Mott, New York, N. Y. . . . . B I . . . .
Cleaneez See Dunlap Co.
Colonial Stamping Co., Brill St. & Passaic Ave., Newark, N. J. . . . . B . . S . .
Crescent Brass Mfg. Co., Spruce & Seventh, Reading, Pa. . . . . B . . . . .
Crouse-Hinds, Syracuse, N. Y. . . . . S H
Diamond Needle & Mfg. Co., Torrington, Conn. (Hickies.) . . . . . I . . . .
Dunlap Co., John, Hammond & Gregg, Carnegie, Pa. . . . . S . .
East Side Metal Spinning Co., 451 Greenwich, New York, N. Y. . . . . B . . . . .
Eureka Tin Ware Mfg. Co., 135 W. 20th, New York, N. Y. . . . . S . .
E-Z Up See Plume & Atwood Mfg. Co.
Farries Mfg Co., Decatur, Ill. . . . . B I S H
Fixturelite Mfg. Co., 468 W. Broadway, New York, N. Y. . . . . B . . . . H
Fralick Co., S. R., 15 S. Clinton, Chicago. . . I . . . .
Franklin Brass Foundry Co., Reading, Pa. . . . B . . . . .
Friedley-Voshardt Co., Chicago. . . . . B . . . . .
Grabler Mfg. Co., 6565 Broadway, S. E., Cleveland, O. . . . . I . . . .
Great Eastern Brass Wks., Inc., 182 Grand, New York, N. Y. (Composition Spindles).
Jiffy. See White Mfg. Co., J. H.
Kwikon. See Fralick Co., S. R.
Lakin. See Thomas & Betts Co.
Liberty Brass Turning Co., 88 Walker, New York, N. Y. . . . . I . . . .
Liberty Iron Pipe & Nipple Works, 62 Greene, New York, N. Y. . . . . B I . . . .
Liberty Machine Co., Wauwatosa, Wis. . . . . B I . . . .
L & K Mfg. Co., 440 Adelphi, Brooklyn, N. Y. . . . . B
L. & W. Brass Wks., 561 W. Superior, Chicago. B . . . . .
Madelite. See Belson Mfg. Co.
M. S. W. Mfg. Co., 1527 Niagara Ave., Buffalo, N. Y. . . . . I . . . .



This is a complete, self-contained molding press — ELECTRO-DRAULIC. No supplementary machines or accessories are required—and no especial skill to operate it. For the manufacturer who would like to produce molded parts in his own plant on the most economical and successful basis, here is the final solution.

TERKELSEN MACHINE COMPANY
Terkelsen Building
Boston, Mass.

DO YOU USE MOLDED PARTS?....

Our bulletin entitled "Synthetic Hot Molding" will be of interest to all plant executives who wish high quality but low cost molding.

SPECIAL PORCELAINS
THOMAS MADE porcelains not only promise but insure an unparalleled grade of insulation; *accuracy* that only skilled craftsmen accustomed to precision workmanship can produce; and *uniformity* that is the direct result of modern production facilities.
The Pioneer's experience befits him to offer the electrical manufacturer an exceptional service in the development of special porcelain parts of most any size or shape no matter how intricate.
Your Inquiries Invited
The R. Thomas & Sons Co.
LISBON, OHIO
U. S. A.
Established in 1873
NEW YORK BOSTON CHICAGO

Thinking in the right material

The right workabilities, right functioning, right appearance, right possibilities of simplification of design, production, assembling and inspection. For some companies these have meant everything, for success against competition. Men who want ideas, for betterments and economies, should study closely every product in which NVF or Phenolite is used.

What they can learn

from modern Radio design, parts and assemblages

PHENOLITE and NVF both are "di-electric," they keep currents where they ought to be; away from where they ought not to be. Their dielectric rating is definite, reliable, and calculable.

Radio seized on them. Their workabilities made it possible to use a single operation to do the work of many; to make one part take the place of many; to design into the new sets the betterments, economies and values that have amazed other industries. They have that uniformity, without which automatics and mass methods fail.

•

We make ten standard kinds of vulcanized fibre including Peerless Insulation and Leatheroid—for electrical insulation and for mechanical uses. We also make Phenolites (reinforced laminated bakelite materials) of many special formulae. Direct NVF representatives in principal cities of the United States, Canada and Europe.

NATIONAL VULCANIZED FIBRE CO.
WILMINGTON, DELAWARE

NVF

All the new, amazing satisfaction-values, here now or coming, are due to

thinking in the right material

FIXTURE FITTINGS—Continued

Meiaun Mfg. Co., 144 E. Morris, Indianapolis, Ind. ..... B .. .. ..
Metal Products Co., 219 Canal, New York.... B .. .. ..
Metro Iron Ornament Co., 191 Christie, New York, N. Y. .... I .. ..
Metropolitan-Columbia Mfg. Co., 714 Metropolitan Ave., Brooklyn, N. Y. ..... B .. .. ..
Midwest Elec. Co., 1639 Walnut, Chicago, Ill.... .. I .. ..
Mid-West Chandelier Co., 14th & Chestnut Sts., Kansas City, Mo. ..... B .. .. ..
Monarch. See Perfecilite Co.
Murlin Mfg. Co., 5420 Paschall Ave., Philadelphia, Pa. ..... B I .. ..
National Elec. Products Corp., Inca Mfg. Div., Fort Wayne Ind. (Studs.) .... I .. ..
New Era Elec. Mfg. Co., 6725 Machinery Ave., N. E., Cleveland, O. .... H
New Wrinkle. See Bryant Elec. Co.
New York Brass Turning Co., 568 Broadway, New York, N. Y. ..... B .. .. ..
Noboit. See Fralick & Co., S. B.
N. W. Cleat Receptacle Bracket, 2437 N. 29th, Philadelphia, Pa. .... I .. ..
Onlt. See Perfecilite Co.
Pass & Seymour, Div. H. Solvay Sta., Syracuse, N. Y. ..... B .. S ..
Perfecilite Co., 1457 E. 40th, Cleveland..... .. .. S ..
Pittsburgh Valve & Fittings Co., Barberton, O. .. I .. ..
Plume & Atwood Mfg. Co., Waterbury, Conn. B .. S H
Plumwood. See Plume & Atwood Mfg. Co.
Plymouth. See Vester Sons, Alfred.
Products Machine Co., Bridgeport, Conn..... B .. .. ..
Reading Brass Co., 141 Schiller, Reading, Pa. B I .. ..
Ribaysen Mfg. Co., J., 953 W. Lake, Chicago, Ill. B .. .. ..
Rodale Mfg. Co., Emaus, Pa..... B .. .. ..
Scovill Mfg. Co., Waterbury, Conn..... B I .. ..
Simpalite. See Sprecher Mfg. Co., P. W.
Simplex. See Plume & Atwood Mfg. Co.
Springfast. See Plume & Atwood Mfg. Co.
Square-Gee. See Grabler Mfg. Co.
Standard Snap-Lite Corp., 504 Jackson Ave., Long Island City, N. Y. .... S ..
Standard Metal Spinning Co., 128 Mott, New York, N. Y. ..... B .. .. ..
Star. See Perfecilite Co.
Star. See Steel City Elec. Co.
Steel City Elec. Co., 1207 Columbus Ave., Pittsburgh, Pa. .... I .. ..
Steele & Johnson Mfg. Co., Waterbury, Conn. B .. S ..
Stembridge & Brandt, 29 S. Clinton, Chicago, Ill. (White Metal.) ..... B .. .. ..
Sterling Spinning & Stamping Wks., 476 Broome, New York, N. Y.
T & B. See Thomas & Betts Co.
Thomas & Betts Co., 15 Park Pl., New York.... .. I .. ..
Una. See Bryant Elec. Co., also Crouse-Hinds, also General Elec. Co., also Hart & Hegeman Mfg. Co., also Pass & Seymour.
United. See L & K Mfg. Co.
United Metal Spinning Co., 440 Adelphi, Brooklyn, N. Y ..... B .. .. ..
Universal Brass Wks., 209 Vine, Philadelphia. B .. .. ..
Vester, Sons, Alfred, 5 Mason, Providence, R. I. B .. .. ..
Victor. See Plume & Atwood Mfg. Co.
Virden, Div. of Gill-Virden Co., 6108 Longfellow Ave., Cleveland, O. ..... B .. .. ..
Walden Tool & Metal Mfg. Co., 3 Oxford, New Haven, Conn. ....
Wameco. See Waterbury Metal Wares Co.
Waterbury Metal Wares Co., Waterbury, Conn. .. .. S ..
Weber Brass Co., Whitney Power Block, Cleveland, O. ..... B .. .. ..
White Diamond. See White Mfg. Co., J. H.
White Mfg. Co., J. H., 79 Madison Ave., New York, N. Y. ..... B .. S ..
Wilhite Machine Wks., 1245 S. Hope, Los Angeles, Cal. ..... B .. .. ..

FLASHERS, Sign

Motor Flashers, Thermal Flashers, Flashing Sockets and Plugs.

Ajax. See Reynolds Spring Co.
A. & W. See General Outdoor Adv. Co.
Angelus. See Electric Sign Flasher Corp.
Betts, Inc., James H., 1393 Sedgwick Ave., New York. (Motor Flashers, Thermal Flashers, Flashing Sockets and Plugs.)
Betts & Betts Corp., 645 W. 43rd, New York, N. Y. (Motor Flashers.) (Thermal Flashers.) Flashing Plugs.)
California Sign Flasher Co., 280 Guttenberg, San Francisco
Commercial Elec. Co., 1203 E. Grant, Portland, Ore.
Consolidated Elec. Sign Corp., Opalume Div., 99 West Main, Battle Creek, Mich.
Diamond. See General Appliance Corp
Eagle Elec. Mfg. Co., 79 Hall, Brooklyn, N. Y.
Electric Signal Corp., 406 Fourth Ave., Seattle, Wash.
Electric Sign Flasher Corp., 1826 W. 9th, Los Angeles, Cal.
Figuregram. See Reynolds Electric Co.
Flash O-Lite. See Betts, Inc., James H.
Flip-Flop. See Betts, Inc., James H.
Gem Engineering Co., Hempstead, N. Y.
Gacor. See General Appliance Corp.
General Appliance Corp., 120 8th, San Francisco, Cal. (Flasher Button.)
General Kontrolar Co., 200 E. First, Dayton, O.
Harrington-Seaberg Corp., 1708 Third Ave., Moline, Ill.
Horn! Signal Mfg Co., 516 Greenwich, New York, N. Y.
Hotchkiss. See Time-O-State Controls Co.
Inchetts. See Betts, Inc., James H
Kontrolar. See General Kontrolar Co. & Leland Elec. Co.
Leland Electric Co., Dayton, O.
Mercury See Betts, Inc. James H.
Phelps Elec. Co., 524 W. Monroe St., (Canal Station) Chicago, Ill. (Motorless)
Phoenix Products Co., Phoenix, N. Y.
Presto Products Co., 520 Broadway, New York, N. Y. (Sockets and Plugs.)
Reco See Reynolds Elec. Co.
Reynolds Elec. Co., 2622 W. Congress, Chicago, Ill.
Reynolds Spring Co., Jackson, Mich.
Rodale Mfg. Co., Emaus, Pa.
Ryan. See Phoenix Products Co.
Skedoodle. See Phelps Elec. Co.
Sokit. See Betts, Inc., James H.
Thermo-Wynk. See Betts & Betts Corp
Time-O-State Controls Co., Elkhart, Ind.
Vacu. See Betts & Betts Corp.
Vechar See Betts, Inc., James H.
Way, Eugene W., Seattle, Wash.
Wood Electric Co. C. D., 565 Broadway, New York N. Y
Woodwin. See Wood Elec. Co., C. D.
Wynk-A-Lyte See Betts & Betts Corp.

FLASHLIGHT LENSES. See Lenses.
FLEXIBLE ARMS. See Tubing, Flexible Metallic.
FLEXIBLE LEADS. Commutator Brush. See Brushes, Commutator.

FLEXIBLE SHAFTING

Binghamton Flexible Shaft Co., 239 Water, Binghamton, N. Y.

GEARS

In Stock—Immediate Delivery

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send us your blue prints and inquiries.

Write for Catalog No. 30

CHICAGO GEAR WORKS

769-773 W. Jackson Blvd. CHICAGO, ILL.

Chicago Flexible Shaft Co., 5600 W. Roosevelt Rd., Chicago, Ill.
Haskins Co., R. G., 4636 W. Fulton, Chicago, Ill.
Stow Mfg. Co., 443 State, Binghamton, N. Y.
Strand & Co., M. A., 5001 N. Lincoln, Chicago, Ill.

FLOODLIGHTS, Electric

Aga Auto Lamp Co., Amesbury, Mass.
FOIL, Tin. See Tin Foil.

FORGINGS, Non-Ferrous

Eureka Metal Product Co., 2208 Elmwood Ave., Buffalo, N. Y.
Rome Mfg. Co. (Div. of Revere Copper & Brass, Inc.), Rome, N. Y.
Scovill Mfg. Co., Waterbury, Conn.

FORMS, Coil Winding

Armature Coil Equipment Co., 2415 Forestdale Ave., Cleveland, O.
Comstock Mfg. Co., Wilkes-Barre, Pa.
Master. See Armature Coil Equipment Co.

FORMS, Wire

Forms and Frames for Shade Holders and Shades: Bending, Welding, Forming.

American Specialty Mfg. Co., 165 Holland Ave., Bridgeport, Conn.
Arrow Wire Frame Corp., 206 E. 27th, New York, N. Y.
Blake & Johnson Co., 1497 Thomaston Ave. (Waterville), Waterbury, Conn.
Central Wire Frame Co., 154 E. 23rd, New York, N. Y. (Complete with socket, cord and plug.)
Chelsea Wire Wks., 675 Hudson, New York, N. Y.
Clark Metal Products Inc., 490 Hancock Ave., Bridgeport, Conn.
City Wire Frame Co., 2025 S. Michigan Ave., Chicago.
Electro Weld Co., 70 Munroe, Lynn, Mass.
Fischer Spring Co., Chas., 238 Kent Ave., Brooklyn, N. Y.
Grammes & Sons, Inc., L. F., Allentown, Pa.
Hubbard Spring Co., M. D., Pontiac, Mich.
Humason Mfg. Co., Forestville, Conn.
Hunter Pressed Steel Co., Lansdale, Pa.
Idealite Lamp Shade Mfg. Co., 49-55 Fremont, Jersey City, N. J.
Jenkinson & Co., B. C., 293 Washington, Newark, N. J.
Kamp Corp., O. S., 1403 Builders Bldg., Chicago, Ill
Jeschke Wire Specialty Wks., Crawfordsville, Ind.
Krischer's Mfg. Co., 255 Calyer, Brooklyn, N. Y.
Manhattan Wire Products Co., 398 First Ave., New York
Mattatuck Mfg. Co., Waterbury, Conn.
Murray Hill Wire Frame Co., 314 E. 23nd, New York, N. Y.
Protectafan Co., 6152 Delmar Blvd., St. Louis, Mo. (Fan Guard.)
Roebling's Sons Co., John A., Trenton, N. J
Russell Mfg. Co., John M., Naugatuck, Conn.
Steinen & Co., 297 Washington, Newark, N. J.
Watral & Sons, 133 E. 16th, New York, N. Y.
Young Industries, Inc., L. A., Detroit, Mich.

FRAMES, Wire. See Forms, Wire.
FRICTION TAPE. See Tape, Rubber and Friction.
FRINGE, Chandelier. See Crystals, Chandelier.

FUSE CLIPS

Roach-Appleton Mfg. Co., 3440 N. Kimball Ave., Chicago.
Sherman Mfg. Co., H. B., Battle Creek, Mich.
Waterbury Brass Goods Co., Waterbury, Conn.

FUSE PLUG SCREW SHELLS. See Shells, Screw Socket.
FUSE TESTERS. See Testers, Fuse and Circuit.

FUSES AND FUSE WIRE

KEY

Cartridge ..... See C
Plug ..... See P
Non-Refillable ..... See N
Refillable ..... See R
Open Link ..... See O
Fuse Wire ..... See O

Acme Elec. & Mfg. Co., Canal & Hamilton Ave., Trenton, N. J. .... P .. .. ..
Aluminum Co. of America, 2444 Oliver Bldg., Pittsburgh, Pa. .... O
Arkless. See Economy Fuse Mfg. Co.
Automatic Elec. Iron & Fuse Co., 315 S. American, Philadelphia, Pa. .... P .. .. ..
Bryant Elec. Co., 1421 State, Bridgeport, Conn.
Bussmann Mfg. Co., University & Jefferson Ave., St. Louis ..... C P N R O
Chase-Shawmut Co., Newburyport, Mass... C P N R O
Clearwite. See Economy Fuse & Mfg. Co.
Clear-Top. See Trico Fuse Mfg. Co.
Colorton. See Trico Fuse Mfg. Co.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn. (Automobile) ..... C .. N R ..
Commercial Enclosed Fuse Co., 1317 Willow Ave., Hoboken, N. J. ..... C P N .. ..
Cote Bros. Mfg. Co., 182 W. Lake, Chicago C P .. R ..
Crystal. See Royal Elec. Co.
Daum Fuse & Elec. Mfg. Co., 1157 Hedgkiss, Pittsburgh ..... C .. .. R ..
D. & W. See Graybar Electric Co.
Eagle Electric Mfg. Co., Inc., 49 Hall Brooklyn, N. Y. .... P .. .. ..
Economy Fuse & Mfg. Co., 2717 Greenview Ave., Chicago, Ill. ..... C P N R ..
Electric Fuseguard Co., Charlottesville, Va.. C P N R ..
Elliott Electric Co., Shreveport, La. ....
Gem. See Jefferson Elec. Co.
General Elec. Co., Section W-329 (Merchandise Dept.), Bridgeport, Conn..... C P N R ..
Graybar Electric Co., New York, N. Y..... C .. ..
Great Western Fuse Co., 1510 Chrysler Bldg., New York, N. Y. .... R ..
H. & H. See Hart & Hegeman.
Hudson Wire Co., Ossining, N. Y .... O
Jefferson Electric Co., 1500 S. Laflen, Chicago, Ill. ..... C P N R O
Kantark. See Trico Fuse Mfg. Co.
Kirkman Engrg. Co., 1 Dominick St., New York, N. Y .. .. C P N .. O
Monarch Fuse Co., 116 E. First, Jamestown, N. Y. ..... C .. N R ..
Multi-Fuse Co., Inc., 4537 W. Lake, Chicago .. .. O
National. See Economy Fuse & Mfg. Co.
Neark. See Colt's Patent Fire Arms Mfg. Co.
Pierce Renewable Fuses, Inc., 77 E. Swan, Buffalo, N. Y ..... C P .. R ..
Platt Bros. & Co., Waterbury, Conn..... .. .. .. O
Powell, F. W., 119 W. Ohio, Pittsburgh... .. P .. R ..
Pyrotite. See Bryant Electric Co.
See-Nu-It Elec. Co., New Bedford, Mass.. C P .. R ..
Rochester Re-Fill Fuse Co., 402 Cottage, Rochester, N. Y. ..... C .. .. R ..
Royal Elec. Co., Chelsea Station, Boston... .. P N .. ..
Seco. See U. S. Electric Co.
Shawmut. See Chase-Shawmut Co.
Simplex. See Powell, F. W.
Six-In-One. See Multi-Fuse Co., Inc.
Star Fuse Co., 235 Canal, New York, N. Y. C P .. R ..
Trico Fuse Mfg. Co., 1001 McKinley Ave., Milwaukee ..... C P N R ..
Union. See Jefferson Elec. Co.
U.S. Electric Co., 18 Chambers, Trenton, N.J. .. P .. .. ..

GALVANIZING

Cattle & Bros., Joseph P., Gaul and Letterly Sts., Philadelphia, Pa.
GALVANOMETERS. See Instruments, Laboratory Standard.

GAS, Inert

Helium Co., Louisville, Ky.
Palestine Industrial Co., 111 Fifth Ave., New York, N. Y.
Weber, Alfred, 5 Union Square, New York, N. Y.
GAS SIGN ELECTRODES. See Electrodes for Gas Signs.

GASKETS,

See also Washers, Non Metallic; Fiber.

Bosley Co., D. W., 906 Marquette Bldg., Chicago, Ill.
Gutta Percha & Rubber Mfg. Co., 15 Park Row, New York.
Canfield Rubber Co., Bridgeport, Conn
Wrigley Bros., 356 W. 18th, New York, N. Y.
GAUZE BRUSHES, Wire. See Brushes, Commutator
GEARS, Fibre. See Gears and Pinions, Composition.

GEARS (Speed Changing Units)

Albro-Clem Elevator Co. and Atlantic Elevator Co., 501 E. Erie Ave., Philadelphia, Pa.
Chicago Gear Works, 769 W. Jackson Blvd., Chicago, Ill.
Cleveland Worm & Gear Co., Cleveland, Ohio.
Cullman Wheel Co., 1346 Altgeld, Chicago, Ill.
De Laval Steam Turbine Co., N. Clinton Ave., Trenton, N. J.
Falk Corp., Milwaukee, Wis.
Farrell-Birmingham Co., 344 Vulcan, Buffalo, N. Y.
Foote Bros. Gear & Machine Co., 215 N. Curtis, Chicago, Ill.
Gears & Forgings, Inc., Cleveland, Ohio.
Grant Gear Works, Boston, Mass.
Horsburgh & Scott Co., Cleveland, O.
James Mfg. Co., D. O., 114 W. Monroe, Chicago, Ill.
Janette Mfg. Co., 556 W. Monroe, Chicago, Ill.
Jones Fdy. & Machine Co., W. A., 16 N. Jefferson, Chicago.
Lewellen Mfg. Co., Columbus, Ind.
Nuttall Wks., of Westinghouse Elec. & Mfg. Co., McCandless Ave & Harrison St., Pittsburgh, Pa.
Morrison Machine Co., Paterson, N. J.
Pelmer-Bee Co., 1750 Poland Ave., Detroit, Mich.
Production Equipment Co., 5319 Windsor Ave., Cleveland, O
Ohio Gear Co., 1336 E. 179th, Cleveland, Ohio.
Perkins Machine & Gear Co., 125 Circuit Ave., Springfield, Mass.
Philadelphia Gear Works, Richmond and Tioga Sts., Philadelphia, Pa.
Smith. Winfield H., Springville, N. Y.

GEARS, Worm

Albaugh-Dover Mfg. Co., 2100 Marshall Blvd., Chicago, Ill.
Chicago Gear Works, 769 W. Jackson Blvd., Chicago, Ill
Cleveland Worm & Gear Co., Cleveland, Ohio.
Colburn Gear & Mfg. Co. (Norfolk Downs), Quincy, Mass.
Ohio Gear Co., 1336 E. 179th, Cleveland, Ohio.
Philadelphia Gear Works, Richmond and Tioga Sts., Philadelphia, Pa.

GEARS AND PINIONS, Composition

Continental Diamond Fibre Co., Bridgeport, Conn.
Delaware Hard Fibre Co., Box 970M Wilmington, Del.
Fabroil. See General Elec. Co.
Foote Bros. Gear & Machine Co., 215 N. Curtis, Chicago
Franklin Fibre Specialty Co., Wilmington, Del.
General Electric Co., Schenectady, N. Y.
Medart Co., St. Louis, Mo.
Micarta. See Westinghouse Elec. & Mfg. Co.
National Vulcanized Fibre Co., Wilmington, Del.
Ohio Gear Co., 1336 E. 179th, Cleveland, Ohio.
Perkins Machine & Gear Co., 125 Circuit Ave., Springfield, Mass.
Stahl Gear & Machine Co., 1390 E. 40th, Cleveland, Ohio
Stranahan Gear Co., Frederick & Valletee, Philadelphia, Pa
Textoil. See General Electric Co.
Textolite. See General Electric Co.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa

GEARS AND PINIONS, Iron and Steel

Chicago Gear Wks., 769 W. Jackson Blvd., Chicago, Ill.
Earle Gear & Machine Co., Wayne Junction, Philadelphia
Falk Corp., Milwaukee, Wis.
Gears & Forgings, Inc., Cleveland, Ohio.
Grant Gear Works, Boston, Mass.
James Mfg. Co., D. O., 114 W. Monroe, Chicago, Ill.
Medart Co., St. Louis, Mo
Meisel Press Mfg. Co., 944 Dorchester Ave., Boston, Mass
Ohio Gear Co., 1336 E. 179th, Cleveland, Ohio.
Perkins Machine & Gear Co., 125 Circuit Ave., Springfield, Mass.
Permag. See Perkins Machine.
Pool Steel Gear & Pinion Co., Cincinnati, Ohio

GEARS AND PINIONS, Rawhide

Chicago Gear Works, 769 W. Jackson Blvd., Chicago, Ill
Chicago Rawhide Mfg. Co., 1287 Elston Ave., Chicago, Ill
Gerdes & Co., 30 Church, New York, N. Y
Syracuse Rawhide Mfg. Co., Syracuse, N. Y.
Western Rawhide & Belting Co., Milwaukee, Wis

GENERATORS. Electroplating. See Plating Generators
GLASS BULBS. See Bulbs, Glass.
GLASS CANDLES. See Candles, Fixture.
GLASS LETTERS. See Letters, Sign.

GLASS for Electrical Purposes

Canton Glass Co., Marion, Ind.
Corning Glass Wks., Corning, N. Y.
Pyrex. See Corning Glass Wks.

GLASSWARE

Bayley & Sons, 105 Vanderveer, Brooklyn, N. Y. "Equalite."
Beaumont Co., Morgantown, W. Va.
Bienenfeld Glass Wks., Inc., 1539 Covert, Brooklyn, N. Y
Bostock Rhoades & Co., 11 N. Moore, New York, N. Y.
Chesler & Sons, J., 41 Varick Ave., Brooklyn, N. Y.
Consolidated Lamp & Glass Co., Coraopolis, Pa. "Amelite," "Aurora," "Cora-Lite," "Martele," "Nullite."

FOR EVERY DEVICE IN WHICH ELECTRICAL HEAT IS USED

REFRACTORIES

YOUR PROBLEM

. . . Will find a most satisfactory and economical answer — tell us what you need.

We have met the problems of many manufacturers of electrically-heated appliances with answers that combined the correct formula in refractory material with a marked saving in costs. We are, primarily, refractory specialists and our experience dates back to the very birth of electrical heat.

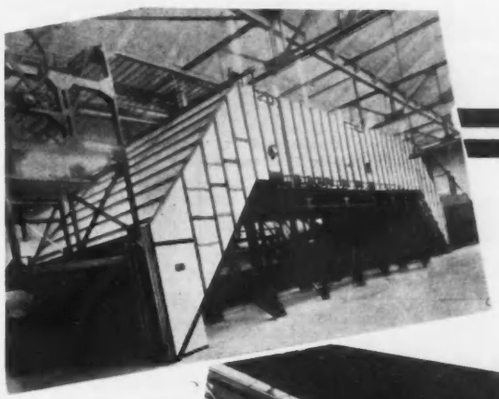
And, ours is an organization with facilities that make possible a kind of service heretofore unknown in the clay-working industry.

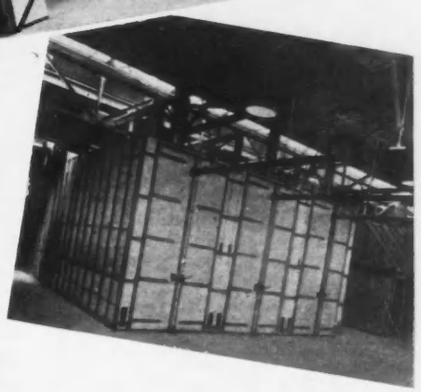
ECR

The ELECTRICAL REFRACTORIES CO.,
50 Clark Street, East Palestine, Ohio

Addresses of Various Representatives:
Chicago—G. D. Wilson, 645 Washington B'vd.
Detroit—R. J. Scothorn, 145 Eastlawn Ave.
St. Louis—R. V. Hughes, 1700 Washington Ave.
San Francisco—E. A. Wilcox, 273 7th Street
Cleveland—Insulation Materials Co., 3221 Carnegie Ave.

Refractories
Manufacturers of electric ranges, stoves & hot plates may find in STAR refractories the most economical solution to a possible problem. We will send a sample on request.
The STAR PORCELAIN COMPANY
TRENTON NEW JERSEY





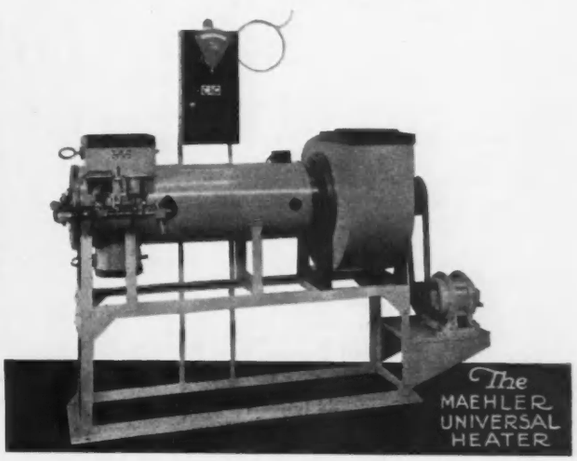
Save on Baking and Drying

If you are already doing industrial baking, Maehler engineers may be able to show you how to *cut fuel costs, improve your product,* or increase the *production* and *safety* of your present oven equipment.

If you are drying products impregnated with insulating varnish, they may be able to show you how to secure a *thoroughly dried product* in uniformly heated ovens in less time and with *less fuel.*

Whatever your baking or drying problem, Maehler engineers have had similar ones to solve. It will not obligate you to consult with them.

The Paul Maehler Company
Industrial Oven Builders
Originators of Safety Appliances to Modern Industrial Ovens
2208-20 West Lake Street
CHICAGO, ILLINOIS



"HOLD-HEET" Dual-Range Pyrometers $25.00 and up

Thermo-Electric Portable, Direct reading

Interchangeable Thermocouples for instantly testing surface temperatures of solids, furnace temperatures and temperatures of molten metals. An accurate, sturdy, convenient instrument at an extremely low price. Write today for descriptive circular.

"Electric Elements that fit the job."

RUSSELL ELECTRIC CO.
386-L W. Huron St., Chicago, U. S. A.

GLASSWARE—Continued
"Pastelle," "Rosedora," "Shade-O-Tone."
Corning Glass Co., Corning, N. Y. "Aurene," "Calcite."
Eagle Mfg. Co., Wellsburg, W. Va.
Erskine Glass & Mfg. Co., Wellsburg, W. Va.
Forger & Co., A. H., 2414 E. 58th, Los Angeles, Cal.
Gill Glass & Fixture Co., Amber & Venango, Philadelphia, Pa. "Allglass," "Gillgio," "Gillway," "Hyperion," "Nova," "Una," "Utilitilite," "Velva."
broidro," "Celatone," "N.B.G.," "Nugloss," "Nebulite," "Nemalite."
Gillinder Bros., Inc., Port Jervis, N. Y. "Astron," "Cosmic," "Orion," "Opolo," "Pearltone."
Gleason-Tiebout Glass Co., 99 Commercial, Brooklyn, N. Y. "Alabaster," "Amazon," "Blanco," "Carmia," "Carrara," "Celestialite," "Florentine," "Gletian," "Gletieco," "Opalux," "Polycase," "Silverglow."
Holophane Co., 342 Madison Ave., New York, N. Y.
Imperial Glass Co., Bellaire, O. "Nuart."
Inland Glass Wks., Inc., 6101 W. 65th, Chicago, Ill. "Snow White," "Inlite," "Alabaster," "Cased," "Crackled," "Etched."
Ivanhoe Division of Miller Co., Meriden, Conn. "Clearcut," "Druid," "Genco," "Ivre," "Regent," "Regello," "Sudan," "Trojan," "Voloria," "Yural."
Jeannette Shade & Novelty Co., Jeannette, Pa. "Ardmore," "Tensolite."
Jefferson Glass Co., Follansbee, W. Va. "Moonstone," "Nitro-Glass."
Kopp Glass, Inc., 2210 Palmer, Swissvale, Pa. "Havana," "Nico," "Delica White."
Lamp & Glass Specialty Co., Monaca, Pa.
Macbeth-Evans Glass Co., Charleroi, Pa. "Alba," "Cremax," "Monax," "Thebian," "Lumite," "Galax."
McFaddin & Co., E. G., 38 Warren, New York, N. Y. "Bellova," "Emeralite."
Perfection Glass Co., Star City, W. Va. "Opiss."
Phoenix Glass Co., Monaca, Pa. "Ivory," "Magnolia," "Radiant."
Plaut & Co., L., 432 E. 23rd, New York, N. Y. "Beryllite."
Rawson & Evans Co., 710 Washington Blvd., Chicago.
Star Glass Co., Star City, W. Va.
Steimer, Doran & Rowe, 336 Fourth Ave., Pittsburgh, Pa. "Radax."
Wells Glass Co., Kokomo, Ind. "Daylite."
Williamsburg Flint Glass Co., 290 Broadway, New York.
Zanesville Mould Co., Zanesville, O.

GONGS, Unmounted Shells
Bevin Bros. Mfg. Co., East Hampton, Conn.
Bridgeport Brass Co., 774 E. Main, Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
East Hampton Bell Co., East Hampton, Conn.
Gong Bell Mfg. Co., East Hampton, Conn.
Hill Brass Co., M. N., East Hampton, Conn.
Liberty Bell Mfg. Co., Minerva, O.
Reiter, G. C., Canton, O.

GRAPHITE BEARINGS. See Bearings, Oil-less.
GREASE CUPS. See Cups, Grease.
GRID LEAKS. See Radio Circuit Components.
GRIDS, Resistance. See Units, Rods and Grids.
GRILL CLOTH. See Cloth, Untreated.
GRINDERS, Commutator. See Tools, Commutator Truing.
GROMMETS. See Eyelets.

GROUND LOCATORS. See Instruments, Portable and Switchboard; also Testers, Coil.
GROWLERS, Armature. See Testers, Coil.
GUARDS, FAN. See Forms, Wire.

HANDLES, Wood; For Switches or Sad Irons
Allen, Chas. E., Pequabuck, Conn.
American Enamel Co., 20 Neville, Providence, R. I.
Bogert & Hopper, 225 Varick, New York, N. Y.
Estes & Son, E. B., 5844 Grand Central Terminal Bldg., New York, N. Y.
Fitchburg Enamel Co., Fitchburg, Mass.
Flanders Hardware Co., North Weare, N. H.
Fuller, J. J. Westfield, Mass.
Narragansett Mach. Co., Pawtucket, R. I.
National Wood Process, New Bedford, Mass.
Novelty Turning Co., Norway, Me.
Ober Mfg. Co., Chagrin Falls, O.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.
Piqua Handle & Mfg. Co., Piqua, Ohio.
Royal Enamel Co., Fitchburg, Mass.
Schutz Bros., 152 Chambers, New York, N. Y.
Stiles & Co., H. A., 174 Portland, Boston, Mass.
Stratton Mfg. Co., Stratton, Maine.
Stromback-Becker Mfg. Co., Moline, Ill.
Sun Enamel Wks., Leominster, Mass.

HEATERS, Industrial
Beckwith Machine Co., 402 Chestnut, Ravenna, O.
Hold-Heet. See Russell Electric Co.
Russell Electric Co., 386 L, Chicago, Ill.
Sta-Warm. See Beckwith Machine Co.

HOLDERS, Brush. See Brushes, Commutator.
HONEYCOMB COILS. See Radio Circuit Components.
HOT WIRE METERS. See Instruments, Portable and Switchboard.
IMPREGNATING COMPOUNDS. See Wax and Compounds.
IMPREGNATING, VACUUM. See Ovens, Industrial.
INCANDESCENT LAMP BULBS (Unfinished). See Bulb Glass.

"MEGGER"
Insulation Testing Instruments
JAGABI Hand Tachometers
FRAHM Frequency Meters
JAMES G. BIDDLE
1209-11 Arch St., Philadelphia
THE "MEG"

INCANDESCENT LAMP FILAMENTS. See Filaments, Incandescent Lamp.

INDICATORS, Operation
Operation and Cost Indicators for Manager's Office.
Bristol Co., Waterbury, Conn. (Elapsed Time Recorder.)
Electric Indicator Corp., Stamford, Conn.
Elinco. See Electric Indicator Corp.

INDUCTION COILS. See Coils, Finished.
INSTRUMENT, Jewels. See Jewels.
INSTRUMENTS, Laboratory Standard. See Instruments, Laboratory Standard.
INSTRUMENTS, Portable Testing. See Instruments, Portable and Switchboard; also Instruments, Pocket.

INSTRUMENTS, Laboratory Standard
Argeo Laboratories, Inc., 150 W. 22nd, New York, N. Y.
Beck Bros., 421 Sedgley Ave., Philadelphia, Pa.
Biddle, James G., 1209 Arch, Philadelphia, Pa.
Burt, R. C., 327 Michigan Ave., Pasadena, Cal. (Oscillosopes.)
Cambridge Instrument Co., Grand Central Terminal Bldg., New York, N. Y.
Chicago Apparatus Co., 1735 N. Ashland Ave., Chicago, Ill.
Delta-Star Elec. Co., 2437 Fulton, Chicago, Ill.
Eppley Laboratory, Newport, R. I. (Standard Cells.)
Fahy. See Rubicon Co.
General Electric Co., Schenectady, N. Y.
Gray Instrument Co., 64½ W. Johnson, Philadelphia, Pa.
Hickok Elec'l Instrument Co., 10514 Dupont, Cleveland, O.
Hold-Heet. See Russell Elec. Co.
Jagabi. See Biddle, James G.
Jewell Elec'l Instrument Co., 1650 Walnut, Chicago, Ill.
Kasson. See Rawson Elec'l. Instrument Co.
Kelvin. See Leeds & Northrup Co.
Kohlrausch. See Leeds & Northrup Co.
Leeds & Northrup Co., 4901 Stanton Ave., Philadelphia, Pa.
Milvay. See Chicago Apparatus Co.
Osiso. See Westinghouse Electric & Mfg. Co.
Rawson Elec'l Instrument Co., Cambridge, Mass.
Roller-Smith Co., 239 Broadway, New York, N. Y.
Rubicon Co., 29 N. Sixth, Philadelphia Pa. (Wheatstone Bridges, Galvanometers, Inductance Condensers, Potentiometers Resistance Boxes, Permeameters.)
Russell Electric Co., 386 L, W. Huron, Chicago, Ill.
Shallcross Mfg. Co., Collingdale, Pa.
Simplex. See Leeds & Northrup Co.
Strobatchy. See Argeo Laboratories, Inc.
Stromberg Electric Co., 223 W. Erie, Chicago, Ill.
Thompson-Levering Co., 351 N. 57th St., Philadelphia, Pa.
Unipivot. See Rawson Elec'l Inst. Co.
Vreeland Apparatus Co., 140 Cedar, New York, N. Y. (Sine Wave Oscillators.)
Westinghouse Electric & Mfg. Co., Newark, N. J.
Weston Elecl. Instrument Corp., 582 Frelinghuysen Ave., Newark, N. J.

INSTRUMENTS, Pocket
Beyer Products Co., 197 Grove, Bloomfield, N. J.
Ideal Instrument Co., Penacook, N. H.
Jewell Elec. Instrument Co., 1650 Walnut, Chicago, Ill.
Kellogg Switchboard & Supply Co., 1066 W. Adams, Chicago, Ill.
Lundquist Tool & Mfg. Co., Worcester, Mass.
Readrite Meter Works, 7 College Ave., Bluffton, Ohio.
Roller-Smith Co., 239 Broadway, New York, N. Y.
Shire Elec. Products Co., Marquette Bldg., Detroit, Mich.
Sholder-Excel Mfg. Co., Clyde, Ohio.
Square D Company, Detroit, Mich.
Sterling Mfg. Co., 2831 Prospect Ave., Cleveland, Ohio.
Weston Elecl. Instrument Corp., 582 Frelinghuysen Ave., Newark, N. J.
Wigginton. See Square D Company.
Yankee. See Lundquist Tool Mfg. Co.

INSTRUMENTS, Portable and Switchboard
This heading includes all standard, portable and switchboard types, measuring and testing instruments—ammeters, voltmeters, wattmeters, ohmmeters, cable testers and fault-finders.
See Also Instruments, Pocket; Also Instruments, Laboratory Standard.
Argeo Laboratories, Inc., 150 W. 22nd, New York, N. Y.
Beck Bros., 421 Sedgley Ave., Philadelphia, Pa.
Beede Instrument Co., Penacook, N. H.
Biddle, James G., 1209 Arch, Philadelphia, Pa.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Wayne and Windrim Sts., Philadelphia, Pa.
Cambridge Instrument Co., Grand Central Terminal, New York, N. Y.
Century Elecl. Co., 100 Randall Ave., Syracuse, N. Y.
Dongan Electric Mfg. Co., 2985 Franklin, Detroit, Mich.
Eastern Specialty Co., 3551 N. Fifth, Philadelphia, Pa.
Edison Lamps Works of G. E. Co., (Nela Park) Cleveland, O.
Electric Heat Control Co., 5902 Carnegie Ave., Cleveland, O. Radio Condenser Test Set.)
Electric Mfg. Co., 966 Mission, San Francisco, Cal.
Esterline-Angus Co., Speedway, Indianapolis, Ind.
Etna Elec. Wks., 410 E. 15th, New York, N. Y.
Fidelity Electric Co., Lancaster, Pa.
Fisher. See Leeds & Northrup.
Fore Elec. Mfg. Co., 4800 Delmar Ave., St. Louis, Mo.
Freyn Engrg. Co., 310 S. Michigan Ave., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
General Radio Co., 30 State, Cambridge, Mass.
Gray Instrument Co., 64½ W. Johnson, Philadelphia, Pa.
Ground-Ohmer. See Sticht & Co.
Handy. See Weinberg & Co.
Heyer Products Co., 197 Grove, Bloomfield, N. J.
Hickok Elecl. Inst. Co., 10514 Dupont, Cleveland, O.
Hoyt Elecl. Inst. Wks., 857 Boylston, Boston, Mass.
I T L. See Illinois Testing Laboratories.
Jewell Elec'l Instrument Co., 1650 Walnut, Chicago, Ill.
King. See Electric Heat Control Co.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.
Master. See Jewell Elecl. Instrument Co.
M D C. See Metropolitan Devices Corp.
Megger. See Biddle.
Metropolitan Devices Corp., 1250 Atlantic Ave., Brooklyn
Multi-Volt Trouble Finder. See Weiford, Jr., Geo. W.
Norton Elecl. Inst. Co., 81 Hilliard, Manchester, Conn.
Paneltest Meters. See Beede Instrument Co.
Paragon Megohmer. See Sticht & Co., H. H.
Peerless Meters. See Thompson-Levering Co.
Pier Equipment Mfg. Co., Benton Harbor, Mich.
Pin-Jack. See Weston Elec'l Instrument Co.
Price Hollister Co., Rockford, Ill.
Queen. See Gray Instrument Co.
Rawson Elecl. Inst. Co., Cambridge, Mass.
Roller Smith Co., 239 Broadway, New York, N. Y.
Sangamo Elec. Co., Springfield, Ill.
Shortfinder. See Eisemann Shortfinder Co.
Standeo. See Sticht Co., H. H.
States Co., Hartford, Conn.
Sterling Mfg. Co., 2831 Prospect Ave., Cleveland, Ohio
Stewart Bros., Ottawa, Ill.
Sticht & Co., H. H., 13 Park Row, New York, N. Y.
Tanner Engrg. Co., Rawson St. and Nelson Ave., Long Island City, N. Y.
Test-A-Bat. See Beede Instrument Co.
Thompson-Levering Co., 351 N. 57th, Philadelphia, Pa.
Thomson. See General Electric Co.
Triplex Meters. See Roller-Smith Co.

PORCELAIN
...the best
INSULATION
COOK POTTERY CO.,
Trenton, N. J.

3 in 1. See Sticht & Co., H. H.
Two-in One. See Stitcht Co., Herman H.
United States Gauge Co., 44 Beaver, New York, N. Y.
Utility. See Esterline-Angus Co.
Westinghouse Electric & Mfg. Co., Newark, N. J.
Weston Elecl. Instrument Corp., 582 Frelinghuysen Ave., Newark, N. J.

INSULATION (Insulating) (Insulators)
Beads. See Beads, Insulating.
Canopy. See Insulators, Canopy.
Cloth. See Cloth & Paper.
Composition. See Molded Insulation.
Compound. See Wax and Comp.
Cutters. See Strippers, Wire.
Fibre. See Fibre.
Lava. See Cores, Resistance Coil.
Marble. See Slate.
Mica. See Mica.
Molded. See Molded Insulation.
Paint. See Paint, Varnish, Laquer.
Paper. See Cloth and Paper Insulating.
Phenolic. See Fibre, Phenol. Also Molded Insulation.
Porcelain. See Porcelain.
Rod. See Rubber, Hard.
Rubber. See Rubber, Hard.
Sealing Wax. See Wax and Compounds.
Slate. See Slate.
Soapstone. See Soapstone.
Tubing. See Tubing, Varnished Fabrics.
Varnish. See Paint and Varnish.
Wax. See Wax and Compounds.

INSULATING MACHINES, WIRE. See Wire Manufacturing Machines.
INSULATING TUBING. See Tubing, Varnished Fabric; also Tubing, Rubber.

INSULATION MIXERS
Baker Perkins Co., Saginaw, Mich.

INSULATION SHEARS. See Shears, Insulation.
INSULATION STRAINING MACHINES. See Wire Manufacturing Machines.
INSULATION TESTERS. See Instruments, Laboratory Standard.

INSULATORS, Canopy
Continental-Diamond Fibre Co., Newark, Del.
Franklin Fibre Specialty Co., Wilmington, Del.
Genera. Electric Co., Schenectady, N. Y.
Macallen Co., 16 Macallen, Boston, Mass.
Wilmington Fibre Specialty Co., Wilmington, Del.

IRON CASTINGS. See Castings, Gray Iron.
IRONS, Soldering. See Soldering Irons.
JACKS, Armature. See Lifts, Armature.
JACKS, Radio. See Radio Receiver Parts.

JARS, Battery, Glass
For Composition Jars. See Molded Insulation; also Rubber.
Corning Glass Co., Corning, N. Y.
Cumberland Glass Mfg. Co., Bridgeton, N. J.
Gaynor Glass Works, Salem, N. J.
Gillinder & Sons, Inc., Philadelphia, Pa.
Hazel-Atlas Glass Co., Wheeling, W. Va.
Macbeth-Evans Glass Co., Charleroi, Pa.
Rodefer Glass Co., 21st, Bellaire, O.
Sneath Glass Co., Wabash Ave., Hartford City, Ind.
United States Glass Co., 9th & Bingham, Pittsburgh, Pa.

JEWELS, Instrument Bearing
Bird, Richard H., Waltham, Mass.
Deknatel & Sons, J. A., Queens Village, N. Y.
Eastern Specialty Co., 3551 N. Fifth, Philadelphia, Pa.
Fisher, Thomas E., Penacook N. H.
Gatti, Inc., Aurele M., Liberty St. & Fairmount Ave., Trenton, N. J.
Mildrum Jewel Co., East Berlin, Conn.
Moser Jewel Co., 367 Division, Perth Amboy, N. J.
Sapphire Products Co., 51 Chambers, New York, N. Y.
Universal. See Oefinger, J. L.
Wennstrom's Sons Co., John, Suffern, N. Y.
Worley Jewel Co., John, Waltham, Mass.

JOINTS, Fixture Insulating
Appleton Elec. Co., 1703 Wellington Ave., Chicago, Ill.
Macallen Co., 16 Macallen, Boston, Mass.
Sprecher Mfg. Co., P. W., 3300 North Ave., Milwaukee.
White Co., O. C., 15 Hermon, Worcester, Mass.
Wittenberg Bros., 60 Shipman, Newark, N. J.

LABORATORY (Laboratories.)
Ovens. See Ovens, Industrial & Laboratory.
Rheostats. See Rheostats.
Testing. See Testing.

LABORATORY STANDARD INSTRUMENTS. See Instruments, Laboratory Standard.
LACQUER, ARMATURE. See Paint, Varnish and Lacquer.
Metal. See Paint, Varnish and Lacquer.
LAMINATIONS. See Discs, Armature.
LAMP BASES. See Bases, Reading Lamp.
LAMP BULBS (Unfinished). See Bulbs, Glass.
LAMP FILAMENTS. See Filaments, Incandescent Lamp.
LAMP LEAD-IN WELDS. See Filaments, Incandescent Lamp.

TESTING INSTRUMENTS

27 years' experience behind "CENTURY" Field, Armature and Field and Armature Testers. Write for bulletins.

CENTURY ELECTRICAL COMPANY
100-102 Randall Ave., Syracuse, N. Y.

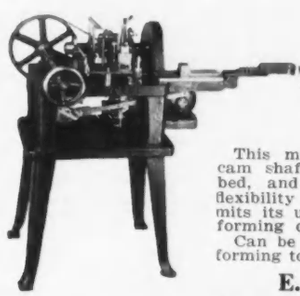
Coil Wire SPRINGS

For all electrical and mechanical manufacturing purposes. All specifications as to quantity and quality are accurately met. Our prices are right and delivery prompt.

Write for Catalog

Advance Spring Corporation

Carroll Ave. and Wood St., Chicago, Illinois



Bench Type

Automatic Wire Forming Machine

This machine is arranged with cam shafts above and below the bed, and at right angles. The flexibility of this arrangement permits its use in a great variety of forming operations.

Can be supplied with or without forming tools as preferred.

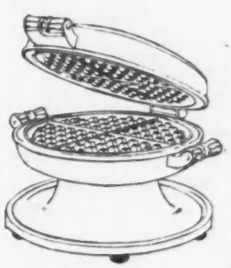
E. R. SEIFERT

Syracuse New York

Rapid Production Machines

Brawley felt feet on Waffle Molds

. . . they never wear out, pull out or lose their factors of protection.



Such a table appliance needs the protective advantages of Brawley Felt Feet because of its daily use and invariably on the polished surface of a table top.

These felt feet are not expensive and they add much to the sales appeal of the appliance of which they are a part.

Three types—nail, wood screw and machine screw.

Free sample of any type you want

T. R. BRAWLEY

FELT COMPANY, INC.

279—20th Street, Brooklyn, N. Y.

Show Window Cord Lamp Cord

LOWELL INSULATED WIRE CO.

Lowell, Mass.

N. E. C. S. Wire Telephone Wire

Better—Quicker—Cheaper Production with our Angle Steel and Sheet Metal Equipment.

We manufacture a Complete Line for Factory and Office.

Write for catalog "C-EM." Shop Desks; Shop Trucks; Tool Stands; Shop Benches; Shop Bench Legs; Chairs; Bench Drawers; Bins, Drill and Reamer; Tool Boxes; Cabinets; Machine Tenders; Waste Cans, etc., etc.

Angle Steel Stool Co.

The Steel Equipment People

Plainwell, Michigan

No. 440 Steel Stool with 11" or 13" diameter seat. Heights: 14", 16", 18", 20", 22", 24", 26". 6 x 12" Steel backrest. Same stool without backrest our No. 40.

No. 1018 Chair. Saddle-style seat, 14½", hardwood; finished Mahogany or Light Oak. Triple steel backrest. Angle steel legs with ball-turned feet. Heights: 16", 18", 20", 22", 24" and 26".

M&W.Co
1876
LACQUERS
ENAMELS
NEW
Prismlac Lacquers
METAL FINISHES
Beautiful Decorative Transparent Colors are obtainable by mixing into Clear Prismlac No. 23 small quantities of—
TINTING PRISMLAC
WOOD FINISHES
CLEAR PRISMLAC WOOD SEALER No. 28
COLORED PRISMLAC WOOD SEALERS
Clear or opaque Sealers which provide a smooth undercoat and background for Clear Prismlac No. 23.
TOP COAT LACQUER
PRISMLAC TOP COAT LACQUER No. 27
Adds lustre and durability without disturbing the crystal pattern of CLEAR PRISMLAC No. 23.
May we suggest how your finish may be improved with Prismlac?
MAAS & WALDSTEIN COMPANY
Executive Offices and Plants:
438 Riverside Ave., Newark, N. J.
Chicago Office and Warehouse: 1115 W. Washington Blvd.
Los Angeles Office and Warehouse: 1214 Venice Blvd.
The border of this advertisement is a photographic reproduction of M & W Prismlac.

LAMP MAKING MACHINES. See Machines, Lamp Making.

LAMP TESTING PHOTOMETERS. See Photometers, Lamp.

LAMPS, Incandescent

Consolidated Electric Lamp Co., 88 Holten, Danvers, Mass.
Cooper-Hewitt. See General Electric.
Edison Lamp Wks. of G. E. Co., Nela Park, Cleveland, O.
Flamelnt. See National Lamp Wks.
Flame-O-Lite. See North American.
General Electric Vapor Lamp Co., 889 Adams, Hoboken, N. J.
Hygrade Lamp Co., Salem, Mass.
Lite-O-Nite. See North American.
Mazda. See Edison Lamp Works, National Lamp Works, Westinghouse.
Nalco. See North American Elec.
National Lamp Wks. (Nela Park), Cleveland, Ohio.
Nilco Lamp Wks., Inc., Emporium, Pa.
North American Elec. Lamp Co., Grand & Hickory, St. Louis, Mo. (Pilot, Signal, Brooder, Vaporizer, Therapeutic)
Safety Elec. Co., 38 S. Dearborn, Chicago, Ill.
Torch-O-Lite. See North American.
Westinghouse Lamp Co., Dept. 203, 150 Broadway, New York, N. Y.

LATHES

(Special for use in Motor Repairing and Motor Mfg.—Test Bench Lathes).

Ajax Electric Co., Kalamazoo, Michigan.
Allen Electric & Equipment Co., Kalamazoo, Michigan.
Cincinnati Lathe & Tool Co., 3207 Disney (Oakley) Cincinnati, Ohio.
Hobart Bros. Company, Troy, Ohio. (Test Bench).
South Bend Lathe Works, 425 E. Madison, South Bend, Ind.
Weidenroff, Joseph, 4352 Roosevelt Rd., Chicago, Ill.

LAVA. See Cores, Resistance Coil.

LEAD

American Lead Co., 3112 Penn Ave., Pittsburgh, Pa.
Columbia Smelting & Refining Wks., 365 West, New York, N. Y.
Federated Metals Corp., 233 Broadway, New York, N. Y.
Jacobson & Son Co., I. M., 15304 Idaho, Detroit, Mich.
National Lead Co., 111 Broadway, New York, N. Y.
United Metals Selling Co., 25 Broadway, New York, N. Y.

LEAD-IN WELDS, Lamp. See Filaments, Incandescent Lamp.

LEADS, FLEXIBLE (Commutator Brush). See Brushes.

LENSES

Sign Letter, Flashlight, Projector and Reflector Lenses. Also glass caps, jewels and bezels for all electrical devices See also Jewels, Instrument Bearing.

American Gas Accumulator Co., Newark Ave., Elizabeth, N. J.
Bausch & Lomb Optical Co., 635 St. Paul, Rochester, N. Y. (Condensing and Projection Lenses.)
Corning Glass Wks, Corning, N. Y. (Flashlight and Signal.)
Deknatel & Sons, J. A., Queens Village, N. Y.
Electric Power Equipment Corp., 412 W. 18th, Philadelphia, Pa.
Elpeco See Electric Power Equipment Corp.
Goerz American Optical Co., C. P., 317 E. 34th, New York.
Jefferson Glass Co., Follansbee, W. Va. (Sign and Flashlight.)
Kliegl Bros. Universal Stage Ltg. Co., 321 W. 50th, New York, N. Y. (Condensing and Projector.)
Macbeth Evans Glass Co., Charlerol, Pa. (Flashlight.)
North Light Corp., 30 W. 15th, New York, N. Y.
Popper & Sons, Leo, 147 Franklin, New York, N. Y.
Pyle National Co., 1334 N. Kostner Ave., Chicago, Ill.
Rodale Mfg. Co., Emaus, Pa.
Rodefer Glass Co., 21st, Bellaire, O. (Flashlight.)
Sneath Glass Co., Wabash Ave., Hartford City, Ind. (Sign.)
Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.

LETTERS, Sign

Glass. Metal.

Adsign Corp, 113 W. 63rd, New York, N. Y.
Chain Products Co., 3924 Cooper Ave., Cleveland, O. (Brass and White Metal.)
Federal Elec. Co., 8700 S. State, Chicago, Ill. (Metal.)
Grammes & Sons, Inc., L. F., Allentown, Pa.

LIFTS, Armature

Lifts. Hoists. Jacks. Trucks, Buggies. Floor Cranes.

Columbia Machine Works & Malleable Iron Co., 263 Chestnut, Brooklyn, N. Y.
Duff-Norton Mfg. Co., Pittsburgh, Pa.
Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.
Peerless. See Electric Service Supplies Co.
Ridlon Company, Frank, Boston, Mass.

LININGS, Socket

Remington Mfg. Co., 937 Barnum Ave., Bridgeport, Conn
LOCK WASHERS. See Washers, Lock.
LOOP WINDERS & SPREADERS. See Winding Machines Armature & Field Coil.
LOUD SPEAKER DIAPHRAGM MATERIAL. See Cloth, Untreated; also Parchment Paper.

LOUD SPEAKERS

Manufacturers Units and Electric Pick-ups for Portable and Built-in Types.

Baritone Mfg. Co., 846 Jackson Blvd., Chicago, Ill.
Boudette Mfg. Co., 67 Crescent Ave., Chelsea, Mass.
Brooklyn Metal Stamping Corp., 730 Atlantic Ave., Brooklyn, N. Y. (Electric Pick-up.)
Cannonball. See Cannon & Miller Co.
Cannon & Miller Co., Springwater, N. Y.
Chelten Electric Co., 4859 Stenton Ave., Philadelphia, Pa.
Conamic. See Operadio Mfg. Co.
Decatur Mfg. Co., 45 Harman St., Brooklyn, N. Y.
Detroit Reproducers, Inc., Lafayette & Meldrum Sts., Detroit, Mich.
Duo-Lac. See F. & H. Radio Laboratories.
Dynola. See Utah Radio Products Co.
Electrical Research Laboratories, 2500 Cottage Grove Ave., Chicago, Ill. (Units.)
Empire United Hat Block Co., 312 E. 22nd, New York.
Fenco Cone Co., 57 Murray, New York, N. Y. (Kit.)
Fidelity Radio Corp., Walker Bank Bldg., Salt Lake City, Utah.
F & H Radio Laboratories, Fargo, N. D.
General Illuminating Co., 1101 Ocean P'kway, Brooklyn, N. Y.
Globe Technolian Corp., Reading, Mass.
G R P See Penn Mfg. Co.
Jack Horner See Operadio Mfg. Co.
Jensen Radio Mfg. Co., 6601 S. Laramie Ave., Chicago, Ill.
Kersten Radio Equipment, Inc., 1415 Fielford, Kalamazoo, Mich.
Kyle See Newcombe-Hawley.
Magnavox Co., 155 E. Ohio, Chicago, Ill. (Also Units.)
Marsone Radio Mfg. Co 303 Devoe, Brooklyn, N. Y (Horn
Miles Reproducer Co., 45 W. 14th. New York, N. Y.
Minuet See Thompson Radio Co.
Newton Elec'l Mfg. Co., Newton, Mass.

NALCO CARBON LAMPS
PILOT LIGHTS
SIGNAL LIGHTS
BROODER LAMPS
VAPORIZER BULBS
THERAPEUTIC BULBS
NORTH AMERICAN ELECTRIC LAMP CO.
Grand and Hickory St. Louis, Mo.

O'Neil Mfg. Corp., 715 Palisade Ave., West New York, N.J.
Operadio Mfg. Co., St. Charles, Ill.
Peerless. See United Reproducers Corp.
Philadelphia Storage Battery Co., Ontario & C Sts., Philadelphia, Pa.
Philco. See Philadelphia Storage Battery Co.
Platter Cabinet Co., North Vernon, Ind.
Puropower. See Platter Cabinet Co.
Racon Elec. Co., 18 Washington Place, New York, N. Y. (Horn only.)
Red Lion Cabinet Co., Red Lion, Pa.
Sonochorde. See Boudette Mfg. Co.
Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.
Swoboda Co., Maritime Bldg., Seattle, Wash.
Thompson Radio Co., 25 Church, New York, N. Y.
Universal. High Power Telephone Co., Carleton Ave. and Eddy, Seattle, Wash.
Utah Radio Products Co., 1737 S. Michigan Ave., Chicago, Ill. (Also Piano Unit.)
Utona. See American Radio Products Corp.
Wondrphone. See Universal High-Power Telephone Co.
Wright-De Coster, Inc., St. Paul, Minn.

LUGS, Copper

Anderson Mfg. Co., Albert & J. M., 239 A St., Boston
Burke Elec. Co., 12th & Cranberry, Erie, Pa.
Dante Elecl. Mfg. Co., Bantam, Conn.
French Mfg. Co., Waterbury, Conn.
General Electric Co., Schenectady, N. Y.
Horan Co., E. S., 550 Monroe, Carlstadt, N. J.
Ilsco Copper Tube & Products, Inc., 5629 Madison Rd., Cincinnati, O.
Sherman Mfg. Co., H. B., Battle Creek, Mich.
Wolverine Tube Co., 1431 Central Ave., Detroit, Mich.

LUMINOUS SPECIALTIES

KEY
Luminous Compound .....See C
Pendants (Bulbs) .....See P
Standard Parts .....See S

Bryant Electric Co., 1421 State, Bridgeport, Conn. .. P
Connecticut Elec. Mfg. Co., Bridgeport, Conn..... S
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee, Wis.
Eagelite. See Eagle Elec. Mfg. Co.
Eagle Elec. Mfg. Co., 79 Hall, Brooklyn, N. Y.... .. .. P
General Elec. Co., Section W-329, Bridgeport, Conn. S P ..
Glo-Guide. See Bryant Elec. Co.
Glow Lite. See Rodale Mfg. Co.
Hubbell, Inc., Harvey, Bridgeport, Conn..... .. P
Luma & Luma Lite. See Radium Dial Co.
National Appliance Co. (Div. of Reynolds Spring Co.), Jackson, Mich. .... S ..
Radieye. See General Electric Co.
Radium Dial Co., 3533 Forbes, Pittsburgh, Pa.... C .. P
Rodale Mfg. Co., Emaus, Pa..... .. .. P
Seelite. See T. C. Smith & Co.
Smith & Co., T. C., 3915 Powelton Ave., Philadelphia P
Undark. See United States Radium Corp. and Bryant Elec. Co.
United States Radium Corp., 535 Pearl, New York, N. Y. ..... C S P

MACHINE SCREWS. See Screws, Machine.
MACHINE SCREW PRODUCTS. See Screw Machine Products.

MACHINES

Armature Banding. See Banding Machines, Armature
Armature Notching. See Notching Machines, Armature
Balancing. See Balancers, Armature.
Banding. See Banding Machines, Armature.
Cable Armoring. See Wire Manufacturing Machines.
Coil Taping. See Taping Machines, Coil.
Coil Winding. See Winding Machines.
Commutator Slotting. See Mica Undercutters.
Engraving. See Engraving Machines.
Incandescent Lamp Making. See Machines, Lamp Making
Molded Insulation. See Presses, Molded Insulation.
Perforating. See Perforating Machines.

DIEMOLDING CORP.
BAKELITE ◆ BEETLE ◆ DUREZ
Molding Service for Plastic Materials
Trade Mark
CANASTOTA, N. Y.

Moulders of Bakelite a synthetic resin
BOONTON MOULDING CO.
300 Myrtle Ave.,
BOONTON, N. J.

Porcelain Molding. See Presses, Porcelain Molding.
Radio Tube. See Machines, Lamp Making.
Shaping. See Shaping Machines, Coil.
Slotting. See Mica Undercutters.
Soldering. See Soldering Machines, Commutator.
Spring Making. See Spring Making Machines.
Taping. See Taping Machines, Coil.
Tension. See Tension Machines, Band Wire.
Winding. See Winding Machines.
Wire, Armoring. See Wire Manufacturing Machines.
Wire Drawing. See Wire Drawing Machinery.
Wire Insulator. See Wire Manufacturing Machines.
Wire Measuring. See Wire Manufacturing Machines
Wire Tension. See Tension Machines, Band Wire.
Wire Wrapping. See Wire Wrapping Machines.

MACHINES, Lamp Making

For Making Incandescent Lamps and Vacuum Tubes.

Argco Laboratories, Inc., 150 W. 22nd, New York, N. Y.
Arrow Mfg. & Machine Co., North Bergen, N. J.
Berrenberg, R., 12 Farnham (Roxbury), Boston, Mass (Vacuum Pumps.)
Cserwenka, Frank, 35 Monroe, Passaic, N. J. (Bombarding Machines.)
Elmer Electric Corp., 770 S. 13th, Newark, N. J.
General Engineering & Supply Co., 160 5th Ave., New York N. Y. (Filament Winder.)
Gesco. See General Engineering & Supply Co.
International Machine Wks., 527 32nd, Union City, N. J.
Rhasen Mfg. Co., 124 45th, Union City, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
York Elec. & Machine Co., 30 Penn, York, Pa.

MACHINES, Bombarding. See Machines, Lamp Making.
MACHINES, Pleating and Fluting. See Pleating Machines.
MACHINES, Spring Making. See Spring Making Machines
MACHINES, WIRE MANUFACTURING. See Wire Manufacturing Machines.
MAGNET CHARGERS. See Chargers, Magnet.
MAGNET STEEL. See Steel, Magnet.
MAGNET TESTERS. See Instruments, Portable and Switchboard; also Instruments, Pocket.
MAGNET WIRE MACHINES. See Enameling Machines for Magnet Wire.
MAGNETIC CHUCKS. See Chucks, Magnetic.
MAGNETIC CLUTCHES. See Clutches, Magnetic.

MAGNETS, Lifting

Ohio Elec. Mfg. Co., 5905 Maurice Ave., Cleveland, O.
MAGNETOMETERS. See Instruments, Pocket.

MAGNETS, Permanent

Colonial Radio Corp., 25 Wilbur Ave., Long Island City, N. Y.
Ind. Steel Products Co., 4545 S. Western Blvd., Chica.
Reisner Mfg. Co., W. H., Hagerstown, Md.
Rogers Drop Forging Co., Worcester, Mass.
Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.
Thomas & Skinner Steel Products Co., 1102 E. 23rd, Indianapolis, Ind.

MALLETS, Raw Hide

Chicago Rawhide Mfg. Co., 1287 Elston Ave., Chicago, Ill.
Garland Mfg. Co., Saco, Me.
Holbrook Raw Hide Mfg. Co., 748 N. Main, Providence, R. I.
MANGANESE, Battery. See Chemicals, Battery.

MARKERS AND STAMPERS, Metal

Schmidt, Inc., Geo. T., 4102 Ravenswood Ave., Chicago, Ill.
MEASURING INSTRUMENTS. See Instruments.
METAL CUTTING OUTFITS. See Welding and Cutting
MECHANICAL RUBBER GOODS. See Rubber Mechanical Goods.
MEGOHMMETERS. See Instruments. Laboratory Standard

MELTING POTS AND LADLES, SOLDER, ETC.

Dunco. See Struthers Dunn, Inc.
Struthers Dunn, Inc., 138 N. Juniper, Philadelphia, Pa.
MERCURY SWITCHES. See Switches, Mercury.
METAL CLEANERS (Compound). See Cleaners, Metal.
Outfits.
METAL FINISHING. See Plating & Finishing.
METAL MARKING OUTFITS. See Engraving Machines.
METALLIC SHADES. See Shades, Metallic.
METERS. See Instruments.
MICA SHADES. See Shades, Mica.
MICA TAPE. See Tape, Mica.
MICA UNDERCUTTERS. See Slotting Machines & Tools. Commutator.

MICA

Asheville Mica Co., Biltmore, N. C.
Asco. See Schoonmaker Insulation Co.
Brand & Co., William, 268 Fourth Ave., New York, N. Y.
Colonial Mica Co., 136 Seventh, Jersey City, N. J.
Continental Diamond Fibre Co., Newark, Del.
Ford Radio & Mica Corp., 830 Fourth Ave., Brooklyn, N. Y.
Gerdau Co., Otto, 533 Canal, New York, N. Y.
Gillespie-Rogers-Pyatt Co., Inc., 99 John, New York, N. Y.
Hirsch Mica Co 1087 Flushing Ave., Brooklyn, N. Y.
Hoyt, Inc., Philip S., Los Tablos, New Mexico.
Huse-Liberty Mica Co., 75 Long Wharf Boston, Mass.
Industrial Mica Corp., 723 64th, Brooklyn, N. Y.
International Mica Co., 3660 Brandywine, Philadelphia, Pa.
Kant Krack. See Huse Liberty Mica Co.
Keene Mica Co., Keene, N. H.
Lamicoid. See Mica Insulator Co.
Macallen Co., 16 Macallen, Boston, Mass.
Micabond. See Continental Diamond Fibre Co.
Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y.
Miralite. See Mitchell-Rand Mfg. Co.
Mica Co. of Canada (N.Y.), Inc., Massena, N. Y.
Mica Insulator Co., 200 Varick, New York, N. Y.
Mica Mfg. Co., 135 Johnson, Brooklyn, N. Y.
Micanite. See Mica Insulator Co.
Mica Products Mfg. Co., 54 Greene, New York, N. Y.
Munsell & Co., Eugene, 200 Varick, New York, N. Y
Nemco. See New England Mica Co.
New England Mica Co., Waltham, Mass.
New England Minerals, Inc., 85 Devonshire, Boston, Mass
New York Mica & Mfg. Co., Auburn, N. Y.
Orinal & Co., 103 Park Ave., New York, N. Y.
Peerless. See New England Mica Co.
Red Line. See Huse Liberty Mica Co. (Ground Mica.)
Red Streak. See Huse Liberty Mica Co.
Schoonmaker Insulation Co., A. O., 34 University Place, New York, N. Y.
Storrs Mica Co., 41 Union Square, New York, N. Y.
Tar Heel Mica Co., Pinntree, N. C.
Watson Bros., 170 Purchase, Boston, Mass.
MINIATURE SWITCHBOARD SYSTEMS. See Instruments Portable and Switchboard.
MIXERS, INSULATION. See Insulation Mixers
MOLDED
Presses. See Presses, Molded Insulation.
Radio Parts. See Radio Molded Parts.
Shades. See Molded Insulation.

MOLDED INSULATION

Aico. See American Insulator Corp.
Aldur Corp., 40 Flatbush Ave. Ext., Brooklyn, N. Y.

OHIO reliable MOTORS

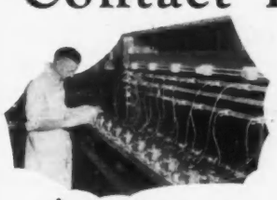
Ohio High Efficiency Motors meet all N. E. M. A. and N. E. L. A. specifications as to Power Factor, Efficiency and low starting Current.

1/30 to 1 Horse Power

THE OHIO ELECTRIC MFG. CO.
5905 Maurice Avenue Cleveland, Ohio

Formerly **THE OHIO ELECTRIC & CONTROLLER CO.**

FANSTEEL
for
Contact Points



Cooperation . . given on development work

ADOPTION of certain types of Tungsten or Molybdenum Contact Points might improve performance or make it possible to cut costs without impairing efficiency.

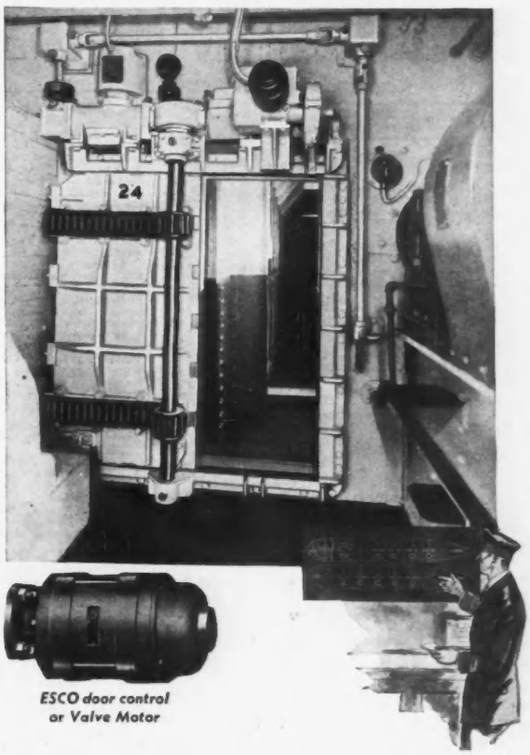
Just send blue prints or a sample of your product. Our research staff, specialists in this work, will study the requirements, make careful tests and recommendations, all at no cost to you.

If necessary, special contact points will be designed for your product and samples for test made to the specifications agreed upon by your engineers and ours. Or forms of contacts standard in our unusually large stock may serve the purpose at great saving. Look into this!

FANSTEEL PRODUCTS CO., INC.
NORTH CHICAGO, ILL.
Pioneer Makers of Tungsten Contact Points

"ESCO" Motors

Chosen by Cutler-Hammer for their Modern Watertight Door Controls



ESCO door control or Valve Motor

CUTLER-HAMMER, INC. has developed a simple and reliable Control System for watertight doors which has conquered one of the chief threats to lives and property at sea. This System has ESCO motor drive and guarantees a quick and positive operation of bulkhead doors in any crisis. Finger-tip Control and dependable electric motor power replace slow uncertain man power. It is "fool-proof" in every respect.

Electric Specialty Co. designs and manufactures motors and generators for special application such as odd voltages and frequencies, "built-in" construction, severe duty cycles, odd dimensions, waterproofing and a hundred other specialties. There also are a number of "Standard" lines designed to be easily adapted to special application.

ESCO Engineers will welcome the opportunity of showing you how efficiently they can serve you by giving you a motor that "fits" electrically and mechanically, on short delivery and at a most reasonable price.

ELECTRIC ESCO SPECIALTY COMPANY
221 SOUTH STREET, STAMFORD, CONN.
Manufacturers of
Motors, Generators, Dynamotors and Rotary Converters

BAKELITE MOULDERS

SHAW

FOUNDED 1892

Insulator Company

IRVINGTON, NEWARK, NEW JERSEY

MOLDED INSULATION—Continued
Arcolite. See American Insulator Corp.
Aladdinite Co., Orange, N. J. (Caseine.)
Allen & Hills, Inc., Auburn, N. Y.
Amber Asbestos Shingle & Sheathing Co., Amber, Pa. (Cold.)
Amberoid. See Amber Asbestos Shingle & Sheathing Co.
American Catalin Corp., 230 Park Ave., New York, N. Y.
American Insulator Corp., New Freedom, Pa.
American Machine & Foundry Co., 5520 Second Ave., Brooklyn, N. Y.
American Record Corp., Scranton, Pa.
Amerine. See American Insulator Corp.
Auburn Button Wks., 48 Canoga, Auburn, N. Y.
Bakelite Corp., 247 Park Ave., New York, N. Y.
Bay State Moulding Co., 1197 Dorchester Ave., Boston.
Beatsol Corp., 228 Hillside Ave., Hillside, N. J.
Belden Mfg. Co., 4633 W. Van Buren, Chicago, Ill.
Bell Mfg. Co., 11 Elkins, Boston, Mass. Radio Parts.
Bettle. See Synthetic Plastics Co., Inc.
Boonton Molding Co., 500 Myrtle Ave., Boonton, N. J.
Boonton Rubber Mfg. Co., 223 Fanny Rd., Boonton, N. J.
Capco. See Monowatt Corp.
Cetec. See Monowatt Corp.
Catalite. See Monowatt Corp.
Coltrock. See Colt's Patent Firearms Mfg. Co.
Chicago Molded Products Co., 2144 Walnut, Chicago, Ill
Cincinnati Molding Co., 2037 Florence Ave., Cincinnati, O.
Celanta Co., Hoosick Falls, N. Y.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Compo-Site, Inc., 207 Astor, Newark, N. J.
Condensite. See Bakelite Corp.
Connecticut Elec. Mfg. Co., Bridgeport, Conn.
Continental-Diamond Fibre Co., Newark, Del.
Cutler-Hammer, Inc., 1238 St. Paul Ave., Milwaukee.
Dayton Insulating Molding Co., 434 E. First, Dayton, Ohio.
Diemolding Corp., Canastota, N. Y.
Dimco. See Dayton Insulating Moulding Co.
Durez. See General Plastics, Inc.
Electrical Insulation Corp., 308 W. Washington, Chicago, Ill.
Electrobestos. See Johns-Manville Corp.
Electrose. See Insulation Mfg. Co.
Erinoid Co., 205 E. 42nd, New York, N. Y.
Everoool. See Bakelite Corp.
Formica Insulation Co., 4638 Spring Grove Ave., Cincinnati, O.
Garfield Mfg. Co., Garfield, N. J. Composition. (Cold.)
General Electric Co., Schenectady, N. Y.
General Moulded Composition Co., 212 Market, Lynn, Mass
General Plastics, Inc., 119 E. Walck Rd., North Tonawanda, N.
Grotelite Co., Grandview & Lafayette Aves., Bellvue, Ky
Gummor. See Garfield Mfg. Co.
Hahn Mfg. Co., Harry W., 623 S. San Pedro, Los Angeles, Cal.
Hemmit. See Garfield, Mfg. Co.
Herculite. See Celesta Co.
Hi-Heet. See Insulation Mfg. Co.
Imperial Molded Products Co., 2925 W. Harrison, Chicago
Improco. See Insulation Products Co.
Inda. See American Machine & Foundry Co.
Insulation Mfg. Co., New York Ave. and Herkimer St Brooklyn, N. Y.
Insulation Products Co., 404 Richland, Pittsburgh, Pa.
International Insulating Corp., Elyria, O.
Johns-Manville Corp., 292 Madison Ave., New York, N. Y.
Karolith Corp., 2125 44th Rd., Long Island City, N. Y. (Casein plastics.)
Kellite. See Kellogg Switchboard & Supply Co.
Kellogg Switchboard & Supply Co., 1066 W. Adams, Chicago, Ill.
Klagges, Chas., 128 147th, Ozone Park, N. Y.
Kuhn & Jacob Machine & Tool Co., 502 Prospect Ave., Trenton, N. J.
Kurz-Kasch Co., S. Broadway & Morris, Dayton, O.
Lacanite. See Scranton Button Co.
Luco Products Corp., 40 Flatbush Ave. Extension, Brooklyn, N. Y.
Lumarith. See Celluloid Corp.
Luxite. See Wilbur & Williams Co.
Macallen Co., 16 Macallen, Boston, Mass.
Mack Molding Co., Wayne, N. J.
Makalot. See Johnson Molding & Tool Co.
Megohom. See Waterbury Button Co.
Micarta Fabricators, Inc., 309 Canal, New York, N. Y.
Micarta. See Westinghouse Elec. & Mfg. Co
Mico. See Molded Insulation Co.
Modern Molded Products Co., Blount and Elm Sts., Providence, R. I.
Moldarta. See Westinghouse Elec. & Mfg. Co.
Molded Insulation Co., 3246 Ludlow, Philadelphia, Pa.
Monowatt Electric Corp., 24 W. 40th, New York, N. Y.
National Appliance Co. (Div. of Reynolds Spring Co.) Jackson, Mich.
Niagara Insul-Bake Specialty Co., 483 Delaware Ave., Albany, N. Y.
Noark. See Colt's Patent Fire Arms Mfg. Co.
Norloc. See Norton Laboratories, Inc.
Northern Industrial Chemical Co., 11 Elkin (South Boston), Boston, Mass.
Norton Laboratories, Inc., Div. 85, Lockport, N. Y.
Panelyte Corp., Lincoln Bldg., New York, N. Y.
Paramix. See Splitdorf Radio Corp.
Paratherm. See Scranton Button Co.
Phenolic. See Scranton Button Co.
Plastic Molding Corp., Sandy Hook, Conn. (Cold.)
Pollopas. See Wilbur & Williams.
Pruven Composition Products Corp., Milford, Conn
Pruvenite. See Pruven Composition Products Co
Pyrolax. See Cutler-Hammer Mfg. Co.
Recto Mfg. Co., Appleton & B.&O. R.R., Cincinnati, O.
Redmonol. See Bakelite Corp. Co.
Realite. See Northern Industrial Chemical Co.
Reynolite. See National Appliance Co.
Reynomold. See National Appliance Co.

Name Plates
ETCHED—ALL METALS
SERIAL PLATES
ETCHED AND LITHOGRAPHED
INSTRUMENT FACE PLATES
DIALS AND SCALES
RADIO ESCUTCHEONS AND METAL PANELS
General Etching & Mfg. Co.
3072-82 W. Grand Ave. Chicago, Ill.

Richardson Co., Lockland, Cincinnati, O.
Ridgelite. See Ridgley Trimmer Co.
Ridgley Trimmer Co., Springfield, O.
Shaw Insulator Co., Irvington, Newark, N. J.
Shawrez. See Insulator Co.
Siemon Co., State and Dewey, Bridgeport, Conn.
Specialty Insulation Mfg. Co., Hoosick Falls, N. Y.
Star Insulate. See Insulation Mfg. Co.
Starite. See Insulation Mfg. Co.
Stokes Rubber Co., Jos., Trenton, N. J.
Stokes & Smith Co., Summerdale Ave. near Roosevelt Blvd., Philadelphia, Pa.
Synthetic Plastic Co., Inc., 535 Fifth Ave., New York, N. Y. (Molding Powder).
Textolite. See General Elec. Co., also Electrical Insulation Corp.
Thermoplax. See Cutler-Hammer Mfg. Co.
Tegit. See Garfield Mfg. Co.
Union Insulating Co., Parkersburg, W. Va.
Vulcabeston. See Colt's Patent Fire Arms Mfg. Co.
Vulcanized Rubber Co., 251 Fourth Ave., New York, N. Y.
Waterbury Button Co. (Elecl. Mfg. Dept.), Waterbury, Conn.
Watertown Mfg. Co., Watertown, Conn.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Wilbur & Williams Co., 261 Park Square Bldg., Boston, Mass. (Molding Powder.)

MOLYBDENUM
American Electro Metal Corp., 65 Madison Ave., New York, N. Y.
Callite Products, 540 Gregory Ave., Union City, N. J.
Eisler Electric Corp., 770 So. 13th St., Newark, N. J.
Fansteel Products Co., Inc., North Chicago, Ill.
Lohfeld & Co., J. L., 53 Park Place., New York, N. Y.
Mallory & Co., P. R., 320 E. Washington, Indianapolis, Ind.
Palatine Industrial Co., 111 Fifth Ave., New York, N. Y.
Sirian Wire Co., 255 Sherman Ave., Newark, N. J.

MONEL METAL
International Nickel Co., 67 Wall, New York, N. Y.

MOTOR CONTROLLERS. See Controllers, Motor.
MOTOR PLATFORM BASES. See Bases, Motor Platform
MOTOR STARTERS. See Controllers, Motor; Switches, Remote Control; Switches, Motor Starting; Safety; Switches Snap (Heavy Duty).

MOTORS

Alternating Current	See S
Direct Current	See S
Motors, 1 Hp. up	See M
Motors Fractional Hp.	See F
Universal	See U

Actodector. See Roth Bros. Co., Div. of Century Electric Co
Advance Elec. Co., 6315 Maple Ave., St. Louis. M F S . .
Allis-Chalmers Mfg. Co., Milwaukee, Wis. . . . . M . . S . .
Allis Co., Louis, Milwaukee, Wis. . . . . M . . S . .
American Elec. Motor Co., Cedarburg, Wis. . . . . M . . . . .
Apex Elec'l Mfg. Co., 1067 E. 152nd, Cleveland . . F S U
Armor Elec. Mfg. Co., 1020 Holland, Erie, Pa. M . . . . .
Baldor Elec. Co. 4352-C Duncan Ave., St. Louis . . . . . M F S . .
B-Line. See Brown-Breckmeyer Co.
Black & Decker Elec. Co., Kent, O. . . . . S U
Bodine Elec. Co., 2254 W. Ohio, Chicago. . . . . F S U
Bogue Elec. Co., Chas. J., 132 King, New York M . . . . .
Brown-Brockmeyer Co., Norwood Power Bldg., Dayton, O. . . . . M F . . .
Burke Elec. Co., Erie, Pa. . . . . M F S U
B. T. See Allis Co., Louis.
B & R Mfg. Co., 812 Lafayette, Toledo, O. . . . . F . . .
Century Elec. Co., 1806 Pine, St. Louis, Mo.. M F S . .
Chandeysson Elec. Co., St. Louis, Mo. . . . . M . . S . .
Clark, Jr., Elec. Co., James, 600 E. Bergman, Louisville, Ky. . . . . M . . . . .
Cleveland Armature Wks., 4732 St. Clair Ave., Cleveland, O. . . . . M . . S . .
Comet Elec. Co., 47 Union Trust Bldg., Indianapolis, Ind.
Continental Elec. Co., 323 Ferry, Newark. . . . . M . . S . .
Crocker-Wheeler Elec. Mfg. Co., Ampere, N. J. M . . S U
Cushman Elec. Co., 69 S. Main, Concord, N. H. M F S . .
Diehl Mfg. Co., Elizabeth, N. J. . . . . M F S . .
Diverter Pole. See Rochester Elec. Product Co.
Dumore Co., 35 16th, Racine, Wis. . . . . F . . U
Duro Co., Dayton, O. . . . . F . . .
Edco. See Electro Dynamic Co.
Electric Machinery Mfg. Co., 1331 Tyler, Minneapolis, Minn. . . . . M . . S . .
Electric Products Co., 1725 Clarkstone Rd., Cleveland, O. . . . . .
Electric Specialty Co., 221 South, Stamford, Conn. . . . . M F S U
Electro Dynamic Co., Bayonne, N. J. . . . . M . . S . .
Emerson Electric Mfg. Co., 2018 Washington Ave., St. Louis, Mo. . . . . M F S U
Esco. See Electric Specialty Co.
Fairbanks-Morse & Co., 900 S. Wabash Ave., Chicago, Ill. . . . . M F . . .
Fidelity Elec. Co., Lancaster, Pa. . . . . M F S .
Fitzgerald Mfg. Co., Torrington, Conn. . . . . F . .
Fynn Weichsel. See Wagner Elec. Corp.
Galvin Elec. Mfg. Co., 3314 S. Broadway, St. Louis, Mo. . . . . F . . .

ZOBELL MOTORS
¼ TO 7½ H.P. STANDARD AND SPECIAL. ALTERNATING AND DIRECT CURRENT.
94 SOUTH AVE. GARWOOD, N. J.

MOULDED PORCELAIN
. . . the most satisfactory
MOULDED INSULATION
COOK POTTERY CO.
Trenton, N. J.

Louis, Mo. . . . . F . . S . .
General Electric Co., Schenectady, N. Y. . . . . M F G . .
Gilbert Co., A. C., New Haven, Conn. . . . . F . . U
Hamilton Beach Mfg. Co., Racine, Wis. . . . . F S U
Hobart Bros. Co., Troy, O. . . . . M . . S . .
Holtzer-Cabot Elec. Co., 125 Amory, Boston. . . . M F . . .
Howell Elec. Motors Co., Howell, Mich. . . . . M F S . .
Ideal Elec. & Mfg. Co., First & Oak, Mansfield, O. . . . . M . . S . .
Imperial Electric Co., Akron, O. . . . . M . . S . .
Janette Mfg. Co., 556 W. Monroe, Chicago. . . . . F S . .
Jantz & Leist Elec. Co., Western Ave. & York, Cincinnati, O. . . . . M F . . .
Kendrick & Davis Co., Lebanon, N. H. . . . . F S . .
Kimble Elec. Co., 634 N. Western Ave., Chicago M . . S U
Leland Elec. Co., Dayton, O. . . . . F S . .
L. E. See Leland Elec. Co.
Lincoln Elec. Co., Cleveland, Ohio . . . . . M . . S . .
Line-Weld. See Lincoln Elec. Co.
Linze Elec. Motor Co., Mansfield, O. . . . . M . . . . .
Mando Co., 911 State Tower Bldg., Syracuse, N. Y. (6-12-40 Volt only) . . . . . F . . . .
Marathon Elec. Mfg. Co., 32 Island, Wausau, Wis. . . F . . .
Marble-Card Elec. Co., Gladstone, Mich. . . . . M . . . . .
Master Electric Co., 100 Davis Ave., Dayton, O. M F S . .
MC. See General Electric Co.
Michigan Elec. & Mfg. Co., Lake Linden, Mich. . . F S . .
Norfolk. See Walter Elec. Mfg. Co.
North East Appliance Corp., Rochester, N. Y. . . F . . U
Northwestern Mfg. Co., 480 Clinton, Milwaukee M . . . . .
Ohio Elec. Mfg. Co., 5905 Maurice Ave., Cleveland, Ohio . . . . . F S . .
O. K. See Marathon Elec. Mfg. Co.
Osann Co., F., 345 Seventh Ave., New York M . . . . .
Peerless Elec. Co., 740 W. Market St., Warren, O. M F S U
Polar Cub. See Gilbert Co., A. C.
Pow-R-Pull. See Wagner Elec. Corp.
Reco. See Reynolds Electric Co.
Red Band. See Howell Elec. Motors Co.
Reliance Elec. & Engrg. Co., 1042 Ivanhoe Rd., Cleveland, O. . . . . M . . S . .
Reynolds Electric Co., 2650 W. Congress, Chicago . . F S . .
Robbins & Myers, Inc., Springfield, O. . . . . M F S U
Roth Bros. & Co., Div. of Century Elec. Co., 1400 W. Adams, Chicago, Ill. . . . . M F S . .
Signal Electric Mfg. Co., Menominee, Mich. . . . F . . .
Standard. See Robbins & Myers Co.
Star Elec. Motor Co., Miller St. & N. J. R. R. Ave., Newark, N. J. . . . . M . . S . .
Sterling Elec. Motors, Inc., Telegraph Rd. and Atlantic Blvd., Los Angeles, Cal. . . . . M . . S . .
Stow Mfg. Co., 443 State, Binghamton, N. Y. M F S U
Sturtevant Co. (Hyde Park), Boston, Mass. . . . M F S U
Sunlight Electrical Mfg. Co., Dana Ave., Warren, O. . . . . F S . .
Super Wick. See Master Elec. Co.
Switch Start. See Lincoln Elec. Co.
Titan Elec. Co., Adrian, Mich.
Union Elec. Motor Mfg. Co., Hancock & Orford Sts., Philadelphia, Pa. . . . . M F S . .
U. S. Elec. Mfg. Co., 200 E. Slawson Ave., Los Angeles . . . . . M . . S . .
Universal Motor Co., Oshkosh, Wis. . . . . M . . . . .
Valley Elec. Co., 4231 Forest Park Blvd., St. Louis, Mo. . . . . M . . S . .
Wagner Elec. Corp., 1935 Indiana Ave., St. Louis, Mo. . . . . M F S U
Walter Elec. Mfg. Co., 215 Cumberland, Norfolk, Va. . . . . M . . S . .
Watson. See Allis Co., Louis.
Welco Uniframe. See Wesche Elec. Co., B. A.
Wesche Elec. Co., B. A., 1622 Vine, Cincinnati M F S . .
Westinghouse Elec. Mfg. Co., East Pittsburgh M F S . .
Woods Mach. Co., S. A., 27 Damrell, Boston. M F S . .
Zobell Elec. Motor Co., 94 South, Garwood, N. J. . . . . M G S . .

NAME PLATES
See also Decalcomania.
American Name Plate Mfg. Co., 117 Imlay, Brooklyn, N. Y.
Angell Embossing Co., 37 Barney-Smith Co., Dayton, O.
Chandler Co., Springfield, Mass.
Continental-Diamond Fibre Co., Newark, Del.
Crowe Name Plate & Mfg. Co., 1749 Grace, Chicago, Ill.
Electro-Chemical Engraving Co., 52 Vanderbilt Ave., New York, N. Y.
Etched Products Corp., 90 Tenth, Long Island City, N. Y.
Etching Co of America, 1520 Montana, Chicago, Ill.
General Etching & Mfg. Co., 3072 W. Grand Ave., Chicago Ill.
Grammes & Sons, Inc., L. F., Allentown, Pa.
Mayer & Co., Geo. J., 36 S. Meridian, Indianapolis, Ind.
Mechanical Engraving Co., 130 Orchard, Newark, N. J.
Premier Metal Etching Co., 14th & Van Alst Ave., Long Island City, N. J.

NICKEL AND NICKEL SILVER
Driver-Harris Co., Harrison, N. J.
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
International Nickel Co., 67 Wall, New York. N. Y
National-Harris Wire Co., Newark, N. J. (Nickel Silver.)
Seymour Mfg. Co., Seymour, Conn.

NICKEL WIRE CLOTH. See Cloth, Wire.

NOTCHING MACHINES, Armature
Ferracute Machine Co., Bridgeton, N. J.
Niagara Machine & Tool Wks., 637 Northland, Buffalo, N. Y.

NUT SETTING MACHINES
Vim Electric Tool Co., 149 Broadway, New York, N. Y.

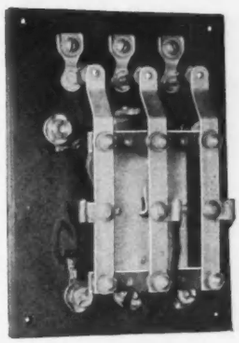
OHMMETERS. See Istruments, Laboratory Standard; also Instruments, Portable and Switchboard.
OIL CUPS. See Cups, Oil.
OIL-LESS BEARINGS. See Bearings, Oil-less.
OSCILLOSCOPES. See Instruments, Laboratory Standard

DUNCO

Relays

There is a DUNCO Relay to meet any current control problem in hundreds of varying applications.

If the DUNCO Catalog doesn't show what you may need, we'll make a *special* relay to your specifications.



Type ATBJ-8

A 3-circuit relay for general control

CONTACTS — Non-Inductive Rating. Single Break. 110 Volts —A. C., 20 Amps.; D. C., 4 Amps. 220 Volts—A. C., 15 Amps.; D. C. 2 Amps.

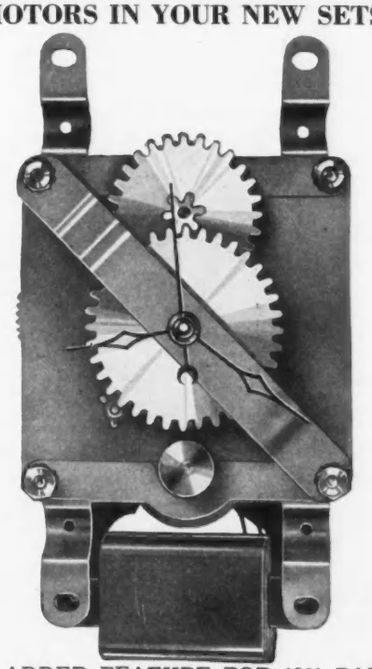
COIL — 8 Watts (Approx.) Continuous Duty. A. C., 12 to 220 Volts; D. C., 4 to 115 Volts.

MOUNTING — Vertical, Front Connected. Variety of housings to suit requirements.

STRUTHERS DUNN, INC.
138 N. Juniper St. Philadelphia, Pa.

ASK FOR IT NOW

INSTALL ELECTRIC CLOCK MOTORS IN YOUR NEW SETS!



AN ADDED FEATURE FOR 1931 RADIOS
Furnished with Housing Also

Manufactured by
ELECTRIC CLOCK CORP. of AMERICA
Division of FAY MFG. CO.
500 S. THROOP ST. Dept. M CHICAGO

DO YOU KNOW?

that the Leland short-circuiting device, one of the principal features of Leland motor design, is largely responsible for the unprecedented increase in Leland motor acceptance among builders of America's very best appliances?

Why? Because the short-circuiting device eliminates the most common causes of motor failure. Trouble is almost unheard of in connection with Leland motors, although countless thousands are in daily use.

Because, like a hinge on a door, or the grandfather clock built in grandfather's time, these motors appear never to wear out or need repair.

A. C. Repulsion Induction
D. C. Compound Wound
A. C. Polyphase

The Leland Electric Co.
Dayton · Ohio · U·S·A

Leland Motors

BREVOLITE LACQUERS

Lacquer Enamel, Spray or Dip
Air Dry Crystal—"Krakle"

BREVOLITE LACQUER CO.
formerly
WAUKEGAN CHEMICAL CO.
NORTH CHICAGO, ILL.

PATENTS
and
TRADE MARKS

Protect your most valuable assets. Expert personal service. 17 years' experience.

LESTER L. SARGENT
Registered Patent Attorney
1115 K St., Washington, D. C.

IMPERVIOUS
INSULATING VARNISH
Electrical Insulating Varnishes and Compounds
IMPERVIOUS VARNISH CO.
Koppers Building
436 Seventh Avenue, Pittsburgh, Penna.

OVENS, Industrial and Laboratory

Annealing, Temper Drawing, Mold Baking, Vulcanising, Drying, Conditioning, Enameling, Japanning, Vacuum Impregnating.

Argco Laboratories, Inc., 150 W. 22nd, New York, N. Y.
Bellevue Industrial Furnace Co., 2971 Bellevue Ave., Detroit, Mich.
Buffalo Fdry. & Machine Co., 1543 Fillmore, Buffalo, N. Y. (Armature and Coil.)
Conran, Frederick M., 107 Colden, Newark, N. J.
Crawford Oven Co., 308 W. Water, New Haven, Conn. (Coil Driers.)
Despatch Oven Co., 622 Ninth, S. E., Minneapolis, Minn.
Detroit Sheet Metal Wks., 1300 Oakman, Detroit, Mich.
Devine Mfg. Co., J. P., Mount Vernon, Ill.
Eberbach & Son Co., Ann Arbor, Mich. (Drying.)
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
Emerson Apparatus Co., 171 Tremont, Melrose, Mass. (Conditioning.)
Freas Thermo Elec. Co., 1206 Grove, Irvington, N. J.
Gehnrich Oven Co., 42-03 35th, Long Island City, N. Y.
General Electric Co., Schenectady, N. Y.
Hess, C. L., 129 Baker, Providence, R. I.
Heidbrink Co., 2633 Fourth Ave., S., Minneapolis, Minn.
Hynes & Cox Elec. Corp., 406 N. Pearl, Albany, N. Y.
Jiffy. See Sioux Battery & Mfg. Co.
Kenworthy, Chas. F., 198 Piedmont, Waterbury, Conn.
Lydon Bros., 229 Colden, Jersey City, N. J.
Machler Co., Paul, 2208 West Lake, Chicago, Ill.
Miho Co., 717 Sycamore, Cincinnati, O.
Sargent & Co., E. H., 155 E. Superior, Chicago, Ill.
Sioux Battery & Mfg. Co., Sioux City, Ia. (Battery.)
Steiner & Co., E. E., 197 E. Kinney St., Newark, N. J.
Stokes Machine Co., F. J., Tabor Rd. (Olney), Philadelphia.
Swartwout Co., 18522 Euclid Ave., Cleveland, O.
Thelco. See Freas Thermo Elec. Co.
Westinghouse Elec. & Mfg. Co., Mansfield, O.
Young Bros. Co., 6512 Mack Ave., Detroit, Mich.

OXIDES, Battery. See Chemicals, Battery.

PACKING

Cooke Seal Ring, Dept. D, 46 N. Green, Chicago Ill.
Federal Metallic Packing Co., Wakefield, Mass.
Holed-Tite Packing, Inc., 100 E. 42nd, New York, N. Y.
Packtite. See Federal Metallic Packing Co.

PAINT, Varnish, Lacquer

KEY
Varnishes, Insulating ..... See V
Painting, Dipping, Spraying, Vacuum Impregnating ..... See P
Paint, Insulating and Acid Proof.. See P
Lacquer, Metal Finishing ..... See L

Acme White Lead & Color Wks., 8250 St. Aubin Ave., Detroit, Mich. L
Ajax. See Sherwin-Williams Co.
Alaka. See Lacquer & Chemical Corp.
American Dt-Electrics, Ltd., Hancock and Bodine, Long Island City, N. Y. ..... V . . .
American Wurtzilite Co., Builders Bldg., Chicago .. P . .
Antakwa Co., 1329 Mohawk, Chicago, Ill. ..... P . .
Arco Co., Cleveland Ohio. ..... P . .
Arizona Lacquer Mfg. Co., 7 16th, Brooklyn, N. Y. . . . L
Armitage Co., John L., 245 Thomas, Newark, N. J. V . . .
Armlac. See Robertson Chemical Co.
Armorlac. See Armitage Co., John L.
Arolac. See Arizona Lacquer Mfg. Co.
Art-Craft. See Southwestern Paint & Varnish Co.
Atlantic Chemical Co., Coit, Irvington, N. J. L
Atom Chemical Co., 96 E. 10th, New York, N. Y. L
Ault & Wiborg Varnish Wks., 432 New, Cincinnati, O. ..... V . . L
Bakelite Corp., 247 Park Ave., New York, N.Y. L
Barrett Varnish Co., 1532 S. 50th Court (Cicero), Chicago, Ill. ..... V . . L
Benolite Co., Manor, Pa. ..... V . . .
Berry Bros., Leib & Wight, Detroit, Mich. ..... V . . .
Billings-Chapin Co., 1163 E. 40th, Cleveland, O.. V . . .
Biwax Corp., 203 S. La Salle St., Chicago, Ill. . . . P . .
Bradshaw-Praeger & Co., 3248 W. 47th Pl., Chicago, Ill. ..... V . . .
Brenzlite Lacquer Co., North Chicago, Ill. L
Calman & Co., Emil, 42 Vernon Blvd., Long Island City, N. Y. ..... V P . .
Carboloid Products Corp., 98 Front, Brooklyn, N. Y. ..... V P . .
Chinalac. See Dolph Co., John C.
Cochrane Chemical Co., 432 Danforth Ave., Jersey City, N. J. ..... V P . .
Code 25. See Mitchell-Rand Mfg. Co.
Columbus Varnish Co., 264 Cozzens, Columbus, O. V . . .
Comulac. See Martindale Elec. Co.
Continental Diamond Fibre Co., Newark, Del. .... V P L
Doe & Co., Walter S., Kent, Ohio. ....
Dolph Co., John C., 168 Emmet, Newark, N. J.. V P . .
Duco. See Du Pont de Nemours & Co.
Du Pont de Nemours & Co., Parlen, N. J. ..... P . .
Dures. See General Plastics.
Eastman Kodak Co., Rochester, N. Y. L
Eclipse Paint & Mfg. Co., Cleveland, O. ..... P . .
E. B. See Mitchell-Rand Mfg. Co.
Egyptian Lacquer Mfg. Co., 90 West, New York. L
Electric Lacquer. See Dolph Co., John C.
Enamelac. See Robertson Chemical Co.
Ever-Brite Products Co., 517 Broadway, East Liverpool, O. L
Ferbert-Schorndorfer Co., 12815 Elmwood Ave., Cleveland, O. ..... V P L
Fesco. See Ferbert-Schorndorfer Co.
Five Point. See American Wurtzilite Co.
General Elec. Co., Bridgeport, Conn. ..... V P . .
General Plastics, Inc., 119-E Walck Rd., N. Tonowanda, N. Y. ..... V . . .
George Co., P. D., St. Louis, Mo. ..... V . . .
G E. See General Elec. Co.
Glidden Co. Cleveland, O. ..... V P L

Glyptal. See General Electric Co., Schenectady.
H. B. See Maas & Waldstein.
Hilo Varnish Corp., Marcy & Flushing Aves., Brooklyn, N. Y. ..... V P L
Impervious Varnish Co., 436 Seventh Ave., Pittsburgh, Pa. ..... V P . .
Insulvar. See Varflex Corp.
Kodalak. See Eastman Kodak Co.
Kraklee. See Brevolite Lacquer Co.
Lackerite. See Twin City Shellac Co., Inc.
Lacquer & Chemical Corp., 214-40th St., Brooklyn, N. Y. ..... P L
Laqueroid. See Glidden Co.
Liberty. See Antakwa Co.
Linolac. See Mica Insulator Co.
Lowe Bros. Co., 450 E. 3rd, Dayton, O. ..... V P . .
Lucas & Co., John, 322 Race, Philadelphia, Pa.. V P . .
Lucote. See Lucas & Co., John.
Maas & Waldstein, 438 Riverside Ave., Newark, N. J. L
Martindale Elec. Co., 1262 W. Fourth, Cleveland, O. ..... V . . .
Mawalac. See Maas & Waldstein.
Meeco. See Henry V. Walker Co.
Mica Insulator Co., 200 Varick St., New York.... V . . .
M. I. C. See Mica Insulator Co.
Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y. V P . .
Nepto Lac. See Lowe Bros. Co.
Nikolas & Co., G. J., 1227 W. Van Buren, Chicago. . . . L
O'Brien Varnish Co., South Bend, Ind. ..... V P L
Opex. See Sherwin-Williams Co.
P. & B. See Ruberoid Co.
Pecora Paint Co., 4th & Sedgeley Ave., Philadelphia, Pa. L
Pedigree. See George Co., P. D.
Peninsular Paint & Varnish Co., 1930 E. Milwaukee, Detroit, Mich. L
Peerless. See Maas & Waldstein.
Prismlac. See Maas & Waldstein.
Proulin. See Acme White Lead & Color Wks.
Pruett-Schaeffer Chemical Co., Taber, Pittsburgh. . . P L
Reliable Leather Dressing Co., 43 Crescent, Long Island City, N. Y. ..... V . . .
Republic Varnish Co., 200 Thomas, Newark, N. J. V . . .
Robertson Chemical Co., 9805 Meech Ave., Cleveland, O. ..... V P . .
R. P. C. See Ruberoid Co.
Schenectady Varnish Co., Schenectady, N. Y. ..... V . . .
Schorndorfer, Ferbert, 12815 Elmwood Ave., Cleveland, O. ..... V P . .
Sherwin-Williams Co., Cleveland, O. ..... V P L
Sico. See Standard Insulation Co.
Sipe & Co., James B., Chamber of Commerce Bldg., Pittsburgh, Pa. L
Southwestern Paint & Varnish Co., 610 Broadway, Kansas City, Mo ..... V P . .
Standard Flexible Comp. Co., 5242 Lancaster Ave., Philadelphia, Pa. ..... V P . .
Standard Insulation Co., East Rutherford, N. J.... V . . .
Standard Lacquer Co., 621 Broadway, New York. . . . L
Standard Varnish Wks., 443 4th Ave., New York. V P L
Sterling Varnish Co., Haysville, Pa. V
Toch Bros., 443 4th Ave., New York ..... V P L
Truscon Laboratories, Canift & Grand Trunk Railway, Detroit, Mich. ..... V . . .
3098. See Mitchell-Rand Mfg. Co.
Twin City Shellac Co., Inc., 333 Flushing Ave., Brooklyn, N. Y. ..... V P L
Varflex Corp., Rome, N. Y. ..... V . . .
Voltex Co., 90 Reservoir Ave., Bridgeport, Conn. V P . .
Walpole. See Robertson Chemical Co.
Walker Co., Henry V., 17 John St., New York.. . . . L
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa. V P . .
Zapon Co., Stamford, Conn. L
Zelactite. See Zeller Lacquer Co.
Zellac. See Zeller Lacquer Mfg. Co.
Zeller Lacquer Mfg. Co., 20 E. 49th, New York. L

PANELS (panel) Engraving. See Engraving.
Radio (Metal) See Radio Mountings.
Radio (Molded) See Radio Molded Parts.
Radio (Hard Rubber) See Rubber Hard.
Meters. See Instruments, Portable & Switchboard.

PAPER

Boxes. See Boxes & Wrappers.
Bushings. See Tubes, Paper.
Candles. See Candles, Fixture.
Cores. See Tubes, Paper.
Fibre. See Cloth and Paper.
Fish. See Cloth & Paper.
Insulating. See Cloth and Paper.
Parchment. See Parchment Paper.
Shades. See Shades, Fabric.
Sleeves. See Tubes, Paper.

PARAFFINE. See Wax and Compounds.

PATENT ATTORNEYS

Sargent, Lester L., 1115 K Street, Washington, D. C.

PARCHMENT PAPER, Lamp Shade

Angel H. Reeve & Co., 7 Spruce, New York, N. Y.
Bergstrom Paper Co., Neenah, Wis.

Dolph's

CHINALAK—A baking insulating varnish that *thoroughly dries*. Deep wound coils, dry from the *inside out*—not merely surface drying. Write for samples.

ELECTRIC LACQUER—Absolutely oil proof and water repellent. Can be brushed, sprayed or dipped. Gives a bright, glossy non-fading black finish and dries in 30 minutes.
JOHN C. DOLPH CO., 168 Emmett St., Newark, N. J.

Bradley Mfg. Co., A. J., 101 Beekman, New York, N. Y.
Brown Paper Co., L. L., Adams, Mass.
Chicago Rawhide Mfg. Co., 1287 Elston Ave., Chicago, Ill.
De Jonge & Co., Louis, 69 Duane, New York, N. Y.
New York & Penn Co., 200 5th Ave., New York, N. Y.
Paterson Parchment Paper Co., 35 Eighth, Passaic, N. J.
Raquette River Paper Co., Potsdam, N. Y.
Reeve & Co., Angel H., 7 Spruce, New York, N. Y.
Special Paper Mfg. Co., 98 Reade, New York, N. Y.
Strype, Fred C., 140 Lafayette, New York, N. Y.
Taylor-Logan Co., Holyoke, Mass.
Union Paper & Twine Co., 116 St. Clair Ave., N. W., Cleveland, O.
Warren Parchment Co., Dexter, N. Y.
Weber Co., F., 1220 Buttonwood, Philadelphia, Pa.
West Carrollton Parchment Co., West Carrollton, O.

PEGS, Armature

Estes & Sons, E. B., 5844 Grand Central Terminal Bldg., New York, N. Y.
Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y.
National Vulcanized Fibre Co., Wilmington, Del.
White Supply Co., 4347 Duncan, St. Louis, Mo.

PENS, Scorching

Gilbert Supply Co., Independence, Iowa.
Little Speedster. See Gilbert Supply Co.
Post Elec. Co., 7 E. 44th, New York, N. Y.
Stylectric. See Post Electric Co.

PERFORATING MACHINES

American Perforator Co., 617 W. Jackson, Chicago, Ill.
Asam Bros., 917 Arch, Philadelphia, Pa.
Asam Wright. See Asam Bros.
Capital Novelty Co., Lincoln, Neb.
Cummings Co., B. F., 4740 Ravenswood Park, Chicago, Ill.
Hamilton Engrs. Products Co., Hamilton, Ohio (Micarta Rolls).

PHENOLIC INSULATION. See Fibre, Phenol. Also Molded Insulation.

PHENOL RESINOID MATERIALS. See Molded Insulations.

PHOSPHOR BRONZE

(Ingot, Rod, Sheet, Wire)
American Brass Co., Waterbury, Conn.
Anaconda. See American Brass Co.
Elephant Brand. See Phosphor-Bronze Smelting Co.
Gilby Wire Co., Riverside Ave., Newark, N. J.
National-Harris Wire Co., Newark, N. J.
Omega. See Riverside Metal Co.
Phosphor-Bronze Smelting Co., 2200 Washington Ave., Philadelphia, Pa.
Riverside Metal Co., Riverside, N. J.
Scovil Mfg. Co., Waterbury, Conn.
Western Cartridge Co., East Alton, Ill.

PHOTO-ELECTRIC TUBES

Arcturus Radio Tube Co., 720 Frelinghuysen Ave., Newark, N. J. (Cell.)
Argco Laboratories, Inc., 150 W. 22nd, New York, N. Y.
Burt, R. C., 327 S. Michigan Ave., Pasadena, Cal.
Electric B-G Products Co., Ithaca, Mich.
Foto Cell. See National Carbon Co.
General Electric Co., Schenectady, N. Y.
G-M Laboratories, Inc., Grace & Ravenswood Ave., Chicago.
Kino-Lamp. See Raytheon Mfg. Co.
Knowles. See Westinghouse Elec & Mfg. Co.
McWilliams. See Electric B-G Products Co.
National Carbon Co., 30 E. 42nd, New York, N. Y.
Photion Instrument Corp., 574 Southern Blvd., New York.
Radiotron Corp., 63 W. 38th, New York, N. Y. (Cells.)
Visitron. See G-M Laboratories, Inc.
Westinghouse Elec. & Mfg. Co., Mansfield, Ohio.

PHOTOMETERS, Lamp Testing

Biddle, James G., 1309 Arch, Philadelphia, Pa.
Edison Lamps Wks. of G. E. Co., (Nela Park) Cleveland
Foote, Pierson & Co., 75 Hudson, Newark, N. J.
Holophane Co., 342 Madison Ave., New York, N. Y.
Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.
Luxometer. See James G. Biddle
Mathews. See Foote, Pierson & Co.
National Lamp Wks. (Nela Park) Cleveland, O.

PICK-UPS, TALKING MACHINE. See Loud Speakers
PIGTAILS, Commutator. See Brushes, Commutator.
Wire Gauze. See Brushes, Commutator.
Vacuum Cleaner See Brushes for Vacuum Cleaners

PINIONS. See Gears and Pinions.
PINION PULLERS. See Pullers, Armature Shaft.
PLASTICS. See Molded Insulation.
PLATES, Name. See Name Plates: Also Decalcomania
Fixture Outlets. See Fixture Fittings.
Storage Battery. See Plates, Storage Battery
Gray Instrument Co., 64½ W. Johnson, Philadelphia, Pa.

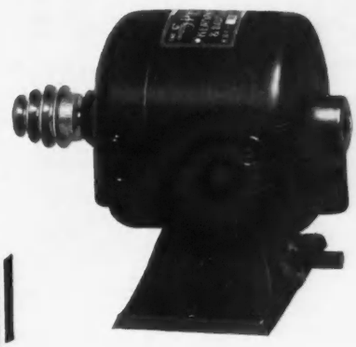
PLATES, Storage Battery

Are Elec'l Corp., 211 E. Columbia, Fort Wayne, Ind.
Buss Structure Co., Besse Bldg., Springfield, Mass. (Steel)
Champion. See Englert Mfg. Co.
Edes Mfg. Co., Plymouth, Mass.
Englert Mfg. Co., 2500 Jane, Pittsburgh, Pa.
Esto. See New Jersey Storage Battery Co.
Fort Wayne Battery Mfg. Co., 230 E. Fourth, Ft. Wayne.
Handler. See Witherbee Storage Battery Co.
Link & Hemrick, Inc., 555 W. 52nd St., New York, N. Y.
New Jersey Storage Battery Co., 658 Summit Ave., Union City, N. J.
Universal Battery Co., 3410 S. La Salle, Chicago, Ill.
Witherbee Storage Battery Co., 75 Columbus Ave., New York

PLATING GENERATORS

American Giant. See Connecticut Dynamo Motor Co.
Rogue Elec. Co., Chas. J., 152 King, New York, N. Y.
Burke Elec. Co., Erie, Pa.

No. 105
110 Volts
Universal
B.H.P. .03
Weight, 4½ lbs.
R.P.M. 3000 up
Shaft ¼-in.
Dimensions 4⅜ x 4⅛ x 4¼



Small Motors

The motor shown is used in many applications such as small lathes, sewing machines, drink mixers, phonograph drives, television discs, etc.

A thoroughly well built motor embodying a 3-step pulley, 8 ft. cord and separable plug. Finish, black Duco. Also furnished on specification, with worm reduction, reducing speeds to 1000, 700 or 350 r.p.m.

We are specialists in building *special* small motors for innumerable uses.

KENDRICK & DAVIS CO.
Lebanon, New Hampshire

Outstandingly Original

50 years
BUILDING QUALITY MOTORS & GENERATORS

WELD-BUILT MOTOR

WE feel justified in proclaiming this the most original and outstanding direct current electric motor ever made.

Its structure is electro-welded rolled steel stock. For this reason it is lighter and stronger than any motor of cast-iron construction.

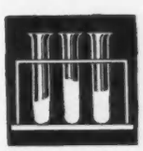
The WELD-BUILT MOTOR is interpole and ball bearing equipped.

Let us send you Bulletin No. 262, illustrating and describing this motor.

ELECTRO DYNAMIC CO.
BAYONNE, N. J.

VITROHM (WL) RESISTORS

Why We ENAMEL Resistors



Ward Leonard has always developed and made its own vitreous enamel

Practically every application demands a different enamel

Enamels are mixed in ball mills for many hours

WE do not enamel our resistors to imitate another's product and thus provide sales talk.

●

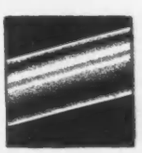
Vitreous enamels are used by us for the protection of wire and terminal connections against chemical action, mechanical injury and for the rapid conduction of heat from the wire.

●

One enamel won't cover all requirements. We use 150 formulae, developed and made by us exclusively to provide for all needs. Specify VITROHM (WL) RESISTORS—It's been safety insurance for 39 years.

This, together with large batches, makes uniformity certain

The enamel bonds with wire, terminals and refractory



The final, tough, hard, tenacious coating is perfect protection.

WARD LEONARD ELECTRIC CO.
Mount Vernon, New York
resistor specialists for more than 39 years

For PORCELAINS
that are
ACCURATE and DEPENDABLE, write
COOK POTTERY CO.
Trenton, N. J.

CONTACT POINTS AND THERMOSTATIC METAL

BAKER Contact Points are made with the thought constantly in mind that, above all, contact points must function with unvarying reliability. We make them of platinum, iridio-platinum, silver and special alloys. Our thermostatic metal is made for high and for low temperatures. Baker Non-Rusting Thermostatic metal is for use where contact with steam or hot water is part of the problem.

BAKER & CO., INC.
54 Austin St. Newark, N. J.

BENJAMIN
TRADE MARK
Swivel Attachment Plugs

They "Keep the Kinks Out of Cords," which means longer life and better service from appliances. Swivel shell turns, cord and base are stationary. Attached and detached with one hand. One-piece construction. Fit standard Edison screw base sockets and receptacles.

Benjamin Electric Mfg. Co.
Desplaines (Chicago Suburb), Ill.
New York, Chicago, San Francisco

PLATING GENERATORS—Continued
Chandeysson Elec. Co., St. Louis, Mo.
Columbia Elec. Mfg. Co., 1292 E. 53rd, Cleveland, Ohio
Connecticut Dynamo Motor Co., Irvington, N. J.
Compro. See Lager Elec. Co.
Eclipse. See Fidelity Elec. Co.
Electric Specialty Co., 221 South, Stamford, Conn.
Esco. See Electric Speciality Co.
Fidelity Elec. Co., Lancaster, Pa.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Hobart Bros. Co., Troy, O.
Holtzer-Cabot Elec. Co., 125 Amory, Boston, Mass.
Ideal Electric & Mfg. Co., First & Oak, Mansfield, O.
Jantz & Leist Elec. Co., Western Ave. & York, Cincinnati.
Kendrick & Davis Co., Lebanon, N. H.
L'Hommedieu & Sons Co., Chas. F., 4521 Ogden Ave. (Hawthorne Station), Chicago, Ill.
Optimus. See Hanson-Van Winkle & Munning Co.
Reliance. See L'Hommedieu & Sons Co., Chas. F.
Roth Bros. & Co., Div. of Century Electric Co., 1400 W. Adams, Chicago, Ill.
Westinghouse Elec. Mfg. Co., East Pittsburgh, Pa.

PLATING AND FINISHING
Chromium Plating, Rust Proofing and other special metal-finishing processes.
Amaloy. See American Machine & Foundry Co.
American Machine & Foundry Co., 5520 Second Ave., Brooklyn, N. Y.
Atlantic Chemical Co., Coit, Irvington, N. J.
Bonderite. See Parker Rust-Proof Co.
Chromalite. See Metals Protection Corp.
Diamond Chrome. See U. S. Chromium Corp.
Duro Chrome. See General Chromium Corp.
Elec. Products Co., Cleveland, O.
Faries Mfg. Co., Decatur, Ill.
General Chromium Corp., 3220 Bellevue Ave., Detroit, Mich. (Chromium Plate.)
Ideal Plating & Polishing Co., 55 Branford, Newark, N. J.
Metals Coating Co. of America, 423 N. Third, Philadelphia.
Metals Protection Corp., 401 Michigan, Indianapolis, Ind.
Parker Rust-Proof Co., 2177 E. Milwaukee, Detroit, Mich.
United Chromium, Inc., 51 E. 42d, New York, N. Y.
Udylite Process Co., 3220 Bellevue Ave., Detroit, Mich. (Rust-Proof Finish.)
U. S. Chromium Corp., Wilkinsburg Sta., Pittsburgh, Pa.
Wetsberg & Greenwald, 71 W 45th, New York, N. Y.

PLATINUM,
Sheet, Rod, Tubing, Wire.
American Platinum Wks., 241 New Jersey Railroad Ave., Newark, N. J.
Baker & Co., Inc., 54 Austin, Newark, N. J.
Bishop & Co., Platinum Wks., J., Malvern, Pa.
Coffin Mfg. Co., B. F., 30 Court, Newark, N. J.
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
Interstate Products Corp., 503 Mulberry, Newark, N. J.
Wilco. See H. A. Wilson Co.
Wildberg Bros., Smelting & Refining Co., 742 Market, San Francisco, Cal.
Wilson Co., H. A., Newark, N. J.

PLUG FUSES. See Fuses and Fuse Wire.
PLUG RECEPTACLES. See Receptacles, Plug.
PLUGS, Flashing. See Flashers, Sign.
PLUGS, Radio. See Radio Receiver Parts.

PLUGS, Attachment
A-1 Bakelite. See Connecticut Elec. Mfg. Co.
Ajax Elec. Specialty Co., 1936 Chestnut, St. Louis, Mo.
Alcor Mfg. Co., 4606 W. Madison, Chicago.
Alden Mfg. Co., Brockton, Mass.
Anylite Elec. Co., 206 Murray, Fort Wayne, Ind.
Arro-Grip. See Arrow Elec.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Beardsley & Wolcott Mfg. Co., Waterbury, Conn.
Beaver Mfg. Co., 625 N. Third, Newark, N. J.
Belden Mfg. Co., 4633 W. Van Buren, Chicago, Ill. (Special Soft Rubber Plug Furnished with Belden Cords)
Benjamin Elec. Mfg. Co. Des Plaines (Chicago Suburb), Ill.
Ben Tap. See Benjamin Electric Mfg. Co.
Bryant Elec. Co., 1421 State, Bridgeport, Conn.
C. H. See Cutler-Hammer Mfg. Co.
Carling Tool & Machine Co., 618 Capital Ave., Hartford, Conn.
Cetlite. See Monowatt Elec. Co.
Cemco. See Connecticut Elec. Mfg. Co.
Circle F Mfg. Co., Trenton, N. J.
Colts Patent Fire Arms Mfg. Co., Hartford, Conn.
Connecticut Elec. Mfg. Co., Bridgeport, Conn.
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee.
C & E. See Ericson Mfg. Co.
DD. See Bryant Elec. Co.
Deal Electric Co., 453 Broome, New York, N. Y.
Diamond, H. See Hart Mfg. Co.
Dreadnaught. See Cutler-Hammer Mfg. Co.
Dubl-Duty. See Bryant Elec. Co.
Eagle Elec. Mfg. Co., 79 Hall, Brooklyn, N. Y.
Eastman Mfg. Co., Manitowoc, Wis.
Edison General Electric Appliance Co., Inc., 5600 W. Taylor, Chicago, Ill.
Electric Co., 94 Allyn, Hartford, Conn.
Ericson Mfg. Co., 3257 Bradford Rd., Cleveland, O.
Eyler Elec. Mfg. Co., 801 S. Adams, Marion, Ind.
York, N. Y.
E-Z. See United States Elec. Mfg. Corp.
Gaynor Electric Co., Inc., Stratford, Conn.
GE-Flex. See General Electric Co.
General Electric Co., Section W-329, Bridgeport, Conn. (Special Soft Rubber Plug furnished with G. E. Cords.)
Globe Metal Mfg. Co., Haggert & Emerald, Philadelphia, Pa
Gold Seal Elecl. Co. of Ohio, Inc., 250 Park Ave., New
Gripall. See Beaver Mfg. Co.
Han-D-Cap. See National Appliance Co.
Handle Cap. See Beaver Mfg. Co
Heetach. See Marks Products Co.
Homco. See Bryant Electric Co.

Hoosick Falls Radio & Electrical Parts Mfg. Co., Hoosick Falls, N. Y.
Hotpoint. See General Electric Appliance Co., Inc.
H. & H. See Arrow-Hart & Hegeman Elec. Co.
Hubbell Inc., Harvey, Bridgeport, Conn
Ilewill Sales & Mfg. Co., 1415 S. Broadway, Dayton, O.
Iffy See Ester Elec. Mfg. Co.
Kool Plug. See Colt's Patent Fire Arms Mfg. Co.
Leviton Mfg. Co., 226 Newell, Brooklyn, N. Y
Marks Products Co., 80 N. Ninth, Brooklyn, N. Y.
Metropolitan Electric Mfg. Co., Blvd. at 14th St., Long Island City, N. Y.
Monowatt Electric Corp., 24 W. 40th, New York, N. Y.
National Appliance Co. (Div. of Reynolds Spring Co.) Jackson, Mich.
Neico. See Nelson Elec. Co.
Nelson Elec. Co., Plant City, Fla.
P. & S. See Pass & Seymour.
Paragon Elec. Sales Co., 215 S. Fifth, Philadelphia, Pa
Pass & Seymour, Div. H., Solvay Sta., Syracuse, N. Y
Quartap. See Connecticut Elec. Mfg. Co.
Peloron Elec. Mfg. Corp., 26 Waverly Pl., New York, N. Y.
Quick Catch. See Hubbell, Inc., Harvey.
Real. See Smith & Co., T. C.
Real Diamond. See Smith & Co., T. C.
Reneo. See Reben Elec. Mfg. Co.
Reynolite Masterpiece. See National Appliance Co.
Ripple. See Bryant Elec. Co.
Safegard Elec. Appliance Co., 1210 Samson, Philadelphia.
Samson-United Corp., Frobert, Rochester, N. Y.
Sears, Henry D., 80 Boylston, Boston 11, Mass.
Simplex Div. of Edison General Elec. Appliance Co., Inc., 5600 W. Taylor, Chicago, Ill.
Smith & Co., T. C., 3915 Powelton Ave., Philadelphia, Pa
Snapit. See Marks Products Co.
Snoco. See Snow & Co., E. W
Snow & Co., E. W., 20 N. Water, Rochester, N. Y.
Spartanette. See Bryant Elec. Co.
Spar Tap. See Bryant Elec. Co.
Standard. See Cutler-Hammer Mfg. Co.
Suitzall. See Beaver Mfg. Co.
Surefit. See Alcor Mfg. Co.
Sure Grip. See Alden Mfg. Co.
T. E. C. See Electric Co.
Tedco. See Paragon Elec. Sales Co.
Telltale Tap. See General Elec. Co.
Templus. See Bryant Elec. Co.
Torrid. See Beardsley & Wolcott Mfg. Co
Triple Tap. See General Elec. Co.
Twin Tap. See General Elec. Co.
United States Elec. Mfg. Corp., 222 W. 14th, New York.
Victory. See Beaver Mfg. Company.
Weber. See Sears, Henry D.
Wellmade Elec. Mfg. Co., Torrington, Conn.
Wilshires. See Iona Co.
Yankee. See Beaver Mfg. Co.

POCKET METERS. See Instruments, Pocket.

POINTS, Contact
American Platinum Wks., 241 New Jersey Railroad Ave., Newark, N. J.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Baker & Co., Inc., 54 Austin, Newark, N. J. (Gold, Platinum, Silver.)
Bishop & Co., Platinum Wks., J., Malvern, Pa.
Coffin Mfg. Co., B. F., 30 Court, Newark, N. J. (Platinum and Silver.)
Cohn, Sigmund, 44 Gold, New York, N. Y. (Platinum.)
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
Fansteel Products Co., North Chicago, Ill.
General Plate Co., Attleboro, Mass.
Hardy Metal Corp., Seattle, Wash.
Interstate Products Corp., 503 Mulberry, Newark, N. J. (Platinum and Silver.)
Mallory & Co., P. R., 329 E. Washington, Indianapolis, Ind.
National Contact Co., 33 W. 60th, New York. (Platinum.)
Spark-O-Metal. See Hardy Metal Corp.
Tungsten Electric Corp., 545 39th, Union City, N. J.
Wilco. See Wilson Co., H. A.
Wilson Co., H. A., Newark, N. J. (Platinum and Silver.

POLARITY INDICATORS. See Instruments, Pocket.
POLISHING MACHINES, WIRE. See Wire Polishing Machines.

PORCELAIN
Beads. See Beads, Insulating.
Bushings. See Bushings, Box & Cabinet.
Cement. See Cement, Liquid, Porcelain.
Insulators. See Porcelain.
Liquid. See Cement, Liquid Porcelain.
Molding Machine. See Presses, Porcelain Molding.
Reflectors (Enameled). See Reflectors, Porcelain Enameled
Refractory. See Cores, Resistance Coil.
Tubes. See Porcelain.

PORCELAIN, Special Shapes
Akron Porcelain Co., Akron, Ohio.
American Porcelain Co., 329 E. Second, E. Liverpool, O.
A. P. See Akron Porcelain Co.
Burgess & Co., East Liverpool, O.
Central Porcelain Co., Columbiana, O.

MOLDING PRESSES
Hot or Cold. Also Pumps, Valves, Accumulators, Fittings, Etc.
Dunning & Boschert Press Co., Inc.
332 W. Water St. SYRACUSE, N. Y.

Challenge Stamping & Porcelain Co., Grand Haven, Mich.
Circle F Mfg. Co., Trenton, N. J.
Colonial Insulator Co., Akron, O.
Connecticut Porcelain Co., Trenton, N. J.
Cook Pottery Co., Trenton, N. J.
Corns China Co., Wellsville, O.
Crowley & Co., 1 Central Ave., West Orange, N. J.
Crowlite. See Crowley & Co.
Electrical Refractories Co., 50 Clark, East Palestine, O.
Globe Porcelain Co., Mulberry St. and St. Joes Ave., Trenton, N. J.
Hartford Faience Co., Hartford, Conn.
Hub-Way Mfg. Co., Hubbard, Ohio.
Illinois Electric Porcelain Co., Macomb, Ill.
Imperial Porcelain Wks., Canal and Mulberry, Trenton, N. J.
Knox Porcelain Corp., Knoxville, Tenn.
Louthan Mfg. Co., East Liverpool, O.
Mercer Porcelain Co., Trenton, N. J.
Metsch Refractories Co., East Liverpool, Ohio.
National Porcelain Co., Trenton, N. J.
New Jersey Porcelain Co., Trenton, N. J.
Nu Blac See Star Porcelain Co.
Pass & Seymour, Inc., Div. H, Solvay Sta., Syracuse, N. Y.
Porcelava. See Burgess & Co.
Porcelain Products, Inc., Findlay, Ohio.
Square D Company, Detroit, Mich.
Standard & Specialty Porcelain Wks., Sun Prairie, Wis.
Star Porcelain Co., Trenton, N. J.
Stupakoff Laboratories, 6625 Hamilton Ave., Pittsburgh, Pa.
Thomas & Sons Co., R., Lisbon, O.
Trenle Porcelain Co., East Liverpool, Ohio.
Union Elec'l Porcelain Wks., Inc., Muirhead Ave., Trenton,
Washington Porcelain Co., Washington, N. J.

POROUS CUPS
Unglazed earthenware cups for primary (wet) batteries
Colonial Insulator Co., Akron, Ohio.
Maddocks Sons, John, Trenton, N. J.
Ohio Pottery Co., Zanesville, Ohio.
Robinson Clay Products Co., Akron, Ohio

POSTS, Binding
Binding Posts, Switch Parts, Stop Points, Contacts, Arms, Levers. See also Radio Mountings.
American Radio Hardware Co., 135 Grand, New York
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Bunnell & Co., J. H., 215 Fulton, New York, N. Y.
Chapman Machine Co., Terryville, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Eby Mfg. Co., Inc., H. H., 22nd & Lehigh, Philadelphia.
Ensign. See Eby Mfg. Co., H. H.
Eureka. See Frank W. Morse Co.
Grammes & Sons, Inc., L. F., Allentown, Pa.
Gray Bros. Co., Plano, Ill.
Hoosick Falls Radio & Electrical Parts Mfg. Co., Hoosick Falls, N. Y.
King. See Morse Co., Frank W.
Morse Co., Frank W., 291 Congress, Boston. (Spring Grip.)
Nutmeg. See Arrow-Hart & Hegeman Elec. Co.
Polk, J. L., 41 Bell Ave., Troy, N. Y.
Premier Elec. Co., 3800 Ravenswood Ave., Chicago, Ill.
Quality. See H. H. Eby Mfg. Co.
Queen. See Morse Co., Frank W.
Thomaston Mfg. Corp., Thomaston, Conn.
Waterbury Button Co. (Elecl. Mfg. Dept.), Waterbury, Conn.

POTENTIOMETERS (Instruments). See Instruments, Laboratory Standard.
POTENTIOMETERS (Radio Control). See Radio Receiver Parts.
POWDERED CARBON. See Carbon, Powdered.
POWER TRANSMISSION CHAIN. See Chain, Power Transmission.
PRESS BOARD. See Cloth and Paper.

PRESSES, Armature Coil
Comstock Mfg. Co., Wilkes-Barre, Pa.

PRESSES, ARMATURE NOTCHING. See Notching Machines, Armature.

PRESSES, Molded Insulation
Burroughs Co., 246 N. Tenth, Newark, N. J.
Busch-Sulzer Bros. Diesel Engine Co., Second & Utah Sts., St. Louis, Mo.
Carver, Fred S., 90 West, New York, N. Y. (Hot Plates.)
Dunning & Boschert Press Co., 332 W. Water, Syracuse,
Duo-Press. See Busch-Sulzer Bros.
Elmes Engrg. Works, Chas. F., 230 N. Morgan, Chicago
Evans Engrg. Works, Chas. E., 1002 Fulton, Chicago, Ill
Farquhar Co., A. B., York, Pa.
French Oil Mill Machinery Co., Piqua, O.
Southwark Fdy. & Mach. Co., 400 Washington Ave., Philadelphia, Pa.
Stokes Mach. Co., F. J., Tabor Rd. (Olney), Philadelphia.
Terkelsen Machine Co., Terkelsen Bldg., Boston, Mass.
Watson-Stillman Co., 75 West St., New York, N. Y
Wood & Co., R. D., Florence, N. J.

PRESSES, Porcelain Molding
Baird, Andrew, 2715 Newark, Detroit, Mich.

PRESSES, Punching and Bending
Bench Presses—Power Presses; for Punching & Stamping Sheet Metal.
American Can Co., 230 Park Ave., New York, N. Y.
Ams Machine Co., Max, 101 Park Ave., New York, N. Y
Baird Machine Co., Bridgeport, Conn.
Bliss Co., E. W., 53rd St. & Second Ave., Brooklyn, N. Y
Camco. See American Can Co.
Federal Press Co., Elkhart, Ind.
Ferracute Machine Co., Bridgeton, N. J.
Hyre Mfg. Co., 200 Varick, New York, N. Y.
Leahbough-Jordan Tool & Machine Co., Elkhart, Ind.
Niagara Machine & Tool Wks., 637 Northland Ave., Buffalo
Peck, Stow & Wilcox Co., Southington, Conn.

PRESSES, Stamping. See Presses, Punching & Bending

PRISMS, Chandelier. See Crystals, Chandelier

WILCOLATOR

TYPE "S" RELAY

12-50 V. 30 Amp.
115 V. 30 Amp.
230 V. 15 Amp.

Alternating Current
2¼" wide—3¼" high

A single pole double break relay for mounting conditions where maximum capacity is desired in a limited space. Common or separate coil control.

A complete service on relay problems is yours for the asking. Write us.

THE WILCOLATOR COMPANY
Newark, New Jersey

MANUFACTURING EXECUTIVE

—who planned trade paper advertising campaign which helped increase number of dealers by 9%.
—who developed and sold to one customer an article which totalled $425,000 sales in 3 years.
—who financed from current operations, sales expansion from $350,000 to $950,000 in 3 years.
—who installed new production control system which released $85,000 from $350,000 inventory, maintained adequate stocks and improved deliveries.
—who developed office methods and personnel for new company whose sales were $1,000,000 in 6 years.

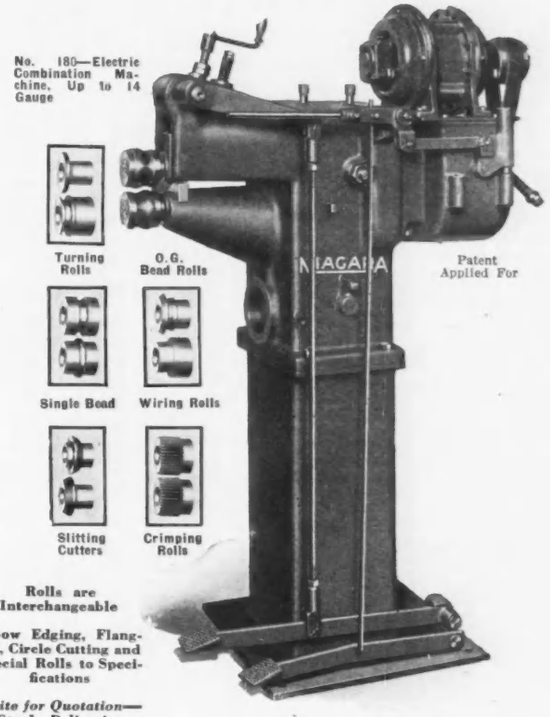
wants connection with medium-sized manufacturer in management capacity. University graduate, age 35, married, primarily interested in opportunity for progress based on results.

Address
Box A, c/o Electrical Manufacturing
461 Eighth Avenue
New York City

NOW . . .

A BIG BROTHER in the NIAGARA line of Electric Combination Machines

For Sheet Metal up to 14 Gauge



ESPECIALLY of interest to manufacturers requiring a real production machine for working sheet metal is this Niagara No. 180, designed to handle, with the greatest speed and economy, sheet metal up to 14 gauge.

Burring, turning, wiring, beading, crimping, crimp and bead, slitting, flanging, elbow edging, circle cutting and other operations are performed faster and at lower cost.

NOTE THESE FEATURES:

Modern machine tool design and construction.
Instant clutch control, hand or foot.
Clutch lock for continuous operation.
Upper shaft adjustment by hand screw or foot treadle.
Lateral adjustment of upper shaft.
Drive shafts are ball bearing.
Roll shafts bronze bushed.
Built-in electric motor.
Electric switch gives overload protection.
Circle shear and flanging attachments available.

NIAGARA MACHINE & TOOL WORKS
637-697 Northland Ave. Buffalo, N. Y.

NEW YORK CITY 50 Church St. PHILADELPHIA Elverson Bldg. PITTSBURGH Park Bldg.

NIAGARA

Machines, Tools and Dies for Working Sheet Metals

PROJECTOR LENSES. See Lenses.

PULLERS, Armature Shaft

Motor Pulley, Shaft & Pinion Pullers & Extractors
Allen Electric & Equipment Co., Kalamazoo, Mich.
Crane Puller Co., West Newton, Mass.
Columbia Machine Works & Malleable Iron Co., 263 Chestnut, Brooklyn, N. Y.
Duff-Norton Mfg. Co., Pittsburgh, Pa.
Electric Service Supplies Co., 17th & Cambria Sts Philadelphia, Pa.
Peerless. See Electric Service Supplies Co.
Premier Electric Co., 3800 Ravenswood Ave., Chicago, Ill.
Weidenhoff, Joseph, 4352 Roosevelt Rd., Chicago, Ill.

PULLEYS, Composition

American Pulley Co., 4200 Wissahickon Ave., Philadelphia
Chicago Gear Works, 769 W. Jackson Blvd., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Ohio Valley Pulley Co., Maysville, Ky.
Rockwood Mfg. Co., 1801 English Ave., Indianapolis, Ind.
Sprucolite Co., Bloomfield, N. J.

PUMPS, Oil Burner

Janette Mfg. Co., 556 W. Monroe, Chicago, Ill.
Reflex. See Simplex Oil Heating Co.
Simplex Oil Heating Co., 1199 Eddy, Providence, R. I.
Teesdale Mfg. Co., 427 Market, Grand Rapids, Mich.

PUMPS, Vacuum

To Exhaust Incandescent Lamps.
Beach-Russ Co., 50 Church, New York, N. Y.
Bishop & Babcock Sales Co., 4901 Hamilton Ave., N. E. Cleveland, O.
Cenco. See Central Scientific Co.
Central Scientific Co., 460 E. Ohio, Chicago, Ill.
Eimer & Amend, 205 3rd Ave., New York, N. Y.
Eisler Elec. Corp., 770 S. 13th, Newark, N. J.
General Electric Co., Schenectady, N. Y.
Hubbard's Sons, Norman, 1 Carlton Ave., Brooklyn, N. Y.
Megavac. See Central Scientific Co.
Packard. See Hubbard's Sons, Norman.

PUNCHERS and RETAINERS

Hercules. See Whitman & Barnes.
Whitman & Barnes, Detroit, Mich.

PUNCHING PRESSES. See Presses, Punching.

PUNCHING and BENDING, Sheet Steel

Anderson Mfg. Co., Albert & J. M., 289 A Boston, Mass.

RACKS, Wire Reel

(With Tension Device Attached).
Armature Coil Equipment Co., 3415 Forestdale Ave., Cleveland, Ohio.
Browning. See Mutual Foundry & Machine Co.
Chapman Elec'l Wks., P. E., 1820 Cheutesu Ave., St. Louis Mo. (Tensionless Dereeler,
Columbia Machine Works & Malleable Iron Co., 263 Chestnut, Brooklyn, N. Y.
Comstock Mfg. Co., Wilkes-Barre, Pa.
Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.
General Elec. Co., Schenectady, N. Y. (Tension Indicator.)
Mutual Foundry & Machine Co., Atlanta, Georgia.
Segur. See Electric Service Supplies Co.

RADIO CIRCUIT COMPONENTS

This heading includes Inductances (Coils), Capacitors (Condensers), Fixed Resistances, Grid Leaks, Transformers, Choke Coils, and Filters, also Amplifier Units and Kits.

Acme Appar. Corp., 39 Osborne, Cambridge, Mass.
Acme Wire Co., New Haven, Conn.
Aero-Call. See Aero Products, Inc.
Aerovox Wireless Corp., 80 Washington, Brooklyn, N. Y.
Aero Products, Inc., 4611 Ravenswood Ave., Chicago, Ill
Ajax Elec. Specialty Co., 1926 Chestnut, St. Louis, Mo.
Ajax Elec. Specialty Co., St. Louis, Mo.
Akra-Ohm. See Shallcross Mfg. Co.
Alden Mfg. Co., Brockton, Mass.
Allen-Bradley Co., 493 Clinton, Milwaukee, Wis.
Amerchoke. See American Transformer Co.
American Apparatus Co., Richmond, Ind.
American Transformer Co., 178 Emmet, Newark, N. J.
Ampertite Rheostat. See Radiall Co.
Amrad Corp., Medford, Hillside, Mass. (Electrolytic Condensers.)
Arco Elec'l Corp., 211 E. Columbia, Fort Wayne, Ind.
Arctic. See Premier Elec. Co.
Art Dial. See Pilot Radio & Tube Corp.
Audioformer Transformer. See Pacent Electric Co.
Autoformer. See Thordarson Elec. Mfg. Co.
Automatic Oil Heat Co., 92 E. Fourth, St. Paul, Minn.
Automotive Parts Mfg. Co., 70 Washington St., Brooklyn.
B-Conomizer. See Pilot Radio & Tube Corp.
Benjamin Elec. Mfg. Co., Des Plaines (Chicago Suburb), Ill.
Bonine. See Turn-It Radio Sales.
Branston Co., Chas. A., 299 Ellicott, Buffalo, N. Y. (Honeycomb Coil.)
Brooklyn Metal Stamping Corp., 718 Atlantic Ave., Brooklyn, N. Y.
Browning-Drake Corp., Calvary, Waltham, Mass.
Buffalo. See De Jur-Amsco Corp.
Campbell Electric Mfg. Co., 15 Stewart, Lynn, Mass.
Capacitgrad. See Pilot Radio & Tube Corp.
Cardwell Mfg. Corp., Allen D., 81 Prospect, Brooklyn, N. Y.
Carter Radio Co., Div. of Utah Radio Products Co., 18th & Michigan Ave., Chicago, Ill.
Centreline. See Pilot Radio & Tube Corp.
Certified Condenser. See Radio Condenser Co.
Chelten Elec. Co., 4859 Stenton Ave., Philadelphia, Pa.
Clarostat Mfg. Co., 281 N. Sixth, Brooklyn, N. Y. (Radio Resistance.)
Cleveland Steel Products Corp., 7306 Madison Ave., Cleveland, O.
Colonial Radio Corp., 25 Wilbur Ave., Long Island City, N. Y.
Concertone. See Chicago-Jefferson Fuse.
Connecticralds. See Alden Mfg. Co.
Continental Carbon, Inc., 13904 Lorain, Cleveland, O.
Continental. See Gardiner & Hepburn, Inc
Cornell Elec. & Mfg. Co., Anable & Rawson, Long Island City, N. Y.
Creamadio Corp., 166-32 Jamaica Ave., Jamaica, N. Y.
Croft. See Premier Elec. Co.
Daven Co., 158 Summit, Newark, N. J. (Kits)
Davohn. See Daven Co.
DeForest Radio Co., Passaic, N. J.
De Jur-Amsco Corp., 95 Morton, New York, N. Y.
Dongan Elec Mfg. Co., 2985 Franklin, Detroit, Mich.
Dubilier Condenser Corp., 342 Madison av., New York
Dumont Elec. Co., 40 W. 17th, New York, N. Y.
Duratran. See Dubilier Condenser Corp.
Durham & Co., 1936 Market, Philadelphia, Pa.
Dynohmic. See Lynch, Inc.
Eagle Elec. Mfg. Co., 79 Hall, Brooklyn, N. Y.
Electrad, Inc., 178 Varick, New York, N. Y.
Electrical Research Laboratories, 2500 Cottage Grove Ave., Chicago, Ill.

Electro Motive Engineering Corp., 127 W. 17th, New York.
Elkay. See Langbein Kaufman Radio Co.
El Mence. See Electro Motive Engineering Co.
E-Z. See Polymet Mfg. Corp.
Faradon. See Wireless Specialty Apparatus Co.
Fast & Co., John E., 3123 N. Crawford Ave., Chicago, Ill.
Ferranti, Inc., 130 W. 42nd, New York, N. Y.
Filatrol. See De Jur-Amsco Corp.
Filterettes. See Tobe Deutschmann Co.
Flechtheim Co., A. M., 136 Liberty, New York, N. Y.
Ford Radio & Mica Corp., 839 4th Ave., Brooklyn, N. Y.
Frost, Inc., Herbert H., 1142 W. Beardsley, Elkhart, Ind.
Furnell Die Cast Condenser Corp., 16 Hudson, New York.
Gardiner & Hepburn, Inc., 611 Widener Bldg., Philadelphia, Pa.
General Instrument Corp., 225 Varick, New York, N. Y.
General Mfg. Co., 8066 S. Chicago Ave., Chicago, Ill. (Coils.)
General Radio Co., 30 State, Cambridge, Mass.
General Transformer Corp., 910 W. Jackson Blvd., Chicago.
General Winding Co., 214 Fulton, New York, N. Y.
Gen-Win. See General Winding Co.
Glastor. See Daven Co.
Globar Corp., Niagara Falls, N. Y.
Gray & Danielson Mfg. Co., 2101 Bryant, San Francisco, Cal.
Hammarlund Mfg. Co., 424 W. 33rd, New York, N. Y.
Hardwick, Hindle, Inc., 216 Emmett, Newark, N. J.
Harmonik. See Karas Elec. Co.
Hedgehog Transformer. See Premier Elec. Co
Heinemann Elec. Co., Penn. Ave. & Plum, Trenton, N. J.
Hy-Wat. See Electro Motive Engineering Corp.
Igrad Condenser & Mfg. Co., 4322 Lake Ave., Rochester N. Y.
Infra-Dyne. See Gray & Danielson Co.
International Resistance Co., 2006 Chestnut, Philadelphia, Pa.
Isograd, Isoleak. See Pilot Radio & Tube Corp.
Jefferson Electric Co., 1500 S. Laflin, Chicago, Ill.
Kenyon Transformer Co., 122 Cypress Ave., New York, N. Y.
Kilograd. See Pilot Radio & Tube Corp.
Krobiack. See Mountford, C. E.
Kuprox. See Kodel Radio Corp.
Langbein-Kaufman Radio Co., 62 Franklin, New Haven, Conn
Leakandenser. See Daven Co.
Lekeless. See Benjamin Elec. Mfg. Co.
Lemnis. See General Winding Co.
Loftin-White. See Hammarlund Mfg. Co
Lynch Mfg. Co., 630 Ninth Ave., New York, N. Y.
Marco. See Martin-Copeland Co.
Martin-Copeland Co., 101 Sabin, Providence, R. I.
Maxitran. See Electrical Research Laboratories.
Mayo Laboratories, Inc., 231 E. 137th, New York, N. Y.
Marion Elec. Mfg. Co., 24 Cliff, Jersey City, N. J.
Melcoupler. See Robertson-Davis Co.
Meloformer. See Robertson-Davis Co.
Mershon. See Amrad Corp.
Metaleak. See Dubilier Condenser Corp.
Metralign. See General Instrument Corp.
Micadon Condenser. See Dubilier Condenser Corp.
Micamold Radio Corp., 1087 Flushing Ave., Brooklyn, N. Y (Amplifier Kit.)
Mica-Static. See Dubilier Condenser Corp.
Micon Condenser. See Dubilier Condenser Corp.
Microcondenser. See Sterling Mfg. Co.
Microgrid. See Pilot Radio & Tube Corp.
Micvostat. See Premier Elec. Co.
Midline. See Hammarlund Mfg. Co.
Mignon Electric Corp., 909 Genesee, Buffalo, N. Y.
Mountford, C. E., 30 Sullivan, New York, N. Y.
National Co., 61 Sherman St., Malden, Mass.
Neutro-Grad. See Pilot Radio & Tube Corp.
New York Coil Co., Mount Clare, Pa.
Ohio Carbon Co., 12508 Almira Ave., Cleveland, O.
Ohmite Mfg. Co., 629 N. Albany Ave., Chicago, Ill. (Resistance.)
Orthophone. See De Jur-Amsco Corp.
Parent Electric Co., 91 7th Ave., New York, N. Y.
Sam Amplifier. See Samson Electric Co.
Perry Elec'l Resistor Corp., 289 New Main St., Yonkers N. Y
Phasatrol. See Electrad, Inc.
Philmore Mfg. Co., 106 7th Ave., New York, N. Y
Pierce Afro. See United Scientific Laboratories.
Pierce Mfg. Co., 625 W. Jackson Blvd., Chicago, Ill.
Pilot Radio & Tube Corp., Lawrence, Mass.
Pilotran. See Pilot Radio & Tube Corp.
Potter Mfg. Co., North Chicago, Ill. (Electro-Chemical Condensers.)
Polymet Mfg. Corp., 829 E. 134th St., New York, N. Y
Power Rox. See Scott Sales Co.
Powerohm. See International Resistance Co.
Powrad, Inc., 121 Ingraham, Brooklyn, N. Y.
Precise Mfg. Corp., 254 Mill, Rochester, N. Y.
Premier Elec. Co., 3800 Ravenswood Ave., Chicago, Ill
Protectoraid. See Alden Mfg. Co.
Radiall Co., 50 Franklin, New York, N. Y
Radio Appliance Corp., 30 Taylor, Springfield, Mass.
Radio Condenser Co., Thorn & Copewood, Camden, N. J.
Radio Engrg. Laboratories, 100 Wilbur Ave., Long Island City, N. Y (Short Wave Kit.)
Radioloc Switch. See Cutler-Hammer Mfg. Co.
Radio Receptor Co., 106 7th Ave., New York.
Radiostat See Allen-Bradley Co.
Raola. See Modern Elec. Mfg. Co.
Receptrad. See Radio Receptor Co.
Resonator See F. & H. Radio Laboratories.
Remler. See Gray & Danielson Co.
Resistograd. See Pilot Radio & Tube Corp.
Rittenhouse Co., A. E., Honeoye Falls, N. Y. (Sole Selling Agent), Hatheway & Co., 16 Hudson, New York, N. Y.
Roberts Condenser See Hammarlund Mfg. Co
Robertson-Davis Co., 363 W. Superior, Chicago, Ill.
Royalty See Electrad, Inc.
Samson Elec. Co., Canton, Mass.
Sangamo Electric Co., Springfield, Ill. (Transformers & Condensers.)
Sewill Mfg. Co., Waterbury, Conn.
Sensory See Heinemann Electric Co.
Sevison Magneto Engr. Co., 379 Phillips Ave., Toledo, O.
Sickle Co., F. W., 130 Union, Springfield, Mass.
Signal Elec. Mfg. Co., Menominee, Mich.
Silver-Marshall, Inc., 6401 W. 65th St., Chicago. (Amplifier Kits.)
Silvertone. See Radio Receptor Co.
S. L. T. See General Instrument Corp.
Smitimeter See Premier Electric Co.
Spirastor Specialties Co., North Adams, Mass.
Standard Transformer Co., Dana Ave., Warren, O.
Sta-Put. See Martin-Copeland Co.
Sterling Mfg. Co., 2831 Prospect Ave., Cleveland, O.
Stevens Mfg. Corp., 42 Spring, Newark, N. J.
Stromberg-Carlson Tel. Mfg. Co., Rochester, N. Y.
Super Multiformer. See Precise Mfg. Corp.
Super Tonatrol. See Electrad, Inc.
Supertran Transformer. See Ford Radio & Mica Co.
Symphony. See Modern Elec. Mfg. Co.
Synrocondenser. See Precise Mfg. Corp.
Telemonic Coil. See Condenser Corp. of America.
Telos Coil. See Condenser Corp. of America.

Thordarson Elec. Mfg. Co., 500 W. Huron, Chicago, Ill.
Tobe Deutschman Co., Canton, Mass.
Tone Control. See Sprague Specialties Co.
Transcript-Clapp Kit. See Samson Electric Co.
Truphonic Amplification. See Alden Mfg. Co.
Tunadapta. See Lynch, Arthur H.
Tung-Sol Condensers, Inc., 2317 Calumet Ave., Chicago, Ill. (Electrolytic Condensers.)
Twin-aud. See Peerless Radio Co.
Twin-Eight Transformers. See Bodine Electric Co.
Ultra Vario. See Bruno Radio Corp.
Universier Condenser. See Auburn Button Works.
Universal Electro Chemical Corp., 30 W. 15th, New York.
Universal Winding Co., Boston, Mass.
Vitrohm. See Ward Leonard Electric Co.
Volta. See Universal Electro Chemical Corp.
Volumgrad. See Pilot Radio & Tube Corp.
Ward Leonard Electric Co. Mount Vernon, N. Y.
Wasp. See Pilot Radio & Tube Corp.
Wheeler Insulated Wire Co., Bridgeport, Conn.
Wireless Specialty Apparatus Co., 76 Atherton, Jamaica Plain, Boston, Mass.
Yaxley Mfg. Co., 1528 W. Adam, Chicago, Ill.

RADIO HARDWARE. See Radio Mountings.

RADIO MOUNTINGS

Coil Mountings, Coil Sliders and Rods, Switches, Detectors Detector and Grid Leak Mountings, Panel Brackets, Special Radio Hardware & Trimmings, Metal Dials, Metal Panels etc.

Aerovox Wireless Corp., 70 Washington, Brooklyn, N. Y.
Alden Mfg. Co., Brockton, Mass.
American Radio Hardware Co., 135 Grand, New York.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Bonsa. See Haydon & Haydon.
Carborundum Co., Niagara Falls, N. Y. (Detector.
De Jur-Amsco Corp., 95 Morton, New York, N. Y.
Chapman Machine Co., Terryville, Conn.
Durham & Co., 1936 Market, Philadelphia, Pa.
Electrad, Inc., 178 Varick, New York, N. Y.
Etched Products Corp., 90 Tenth, Long Island City, N. Y (Metal Panels.)
Eureka. See Morse Co Frank W.
General Etching & Mfg. Co., 3072 West Grand Ave., Chicago, Ill (Metal Panels & Escutcheons.)
Globe Technolian Corp., Reading, Mass.
Haydon & Haydon, 167 Chambers, New York, N. Y.
Master Engineering Co., 771 Mather, Chicago, Ill.
Morse Co., Frank W., 391 Congress, Boston, Mass.
Na-Ald. See Alden Mfg. Co.
Union Insulating Co., 296 Broadway, New York, N. Y.
Waddell Mfg. Co., Grand Rapids, Mich.

RADIO PANEL ENGRAVING. See Engraving, Radio Panel

RADIO RECEIVER PARTS

Rheostats, Sockets, Plugs, Jacks.

Alden Mfg. Co., Brockton, Mass.
Acme Elec. & Mfg. Co., 1439 Hamilton Ave., Cleveland, O.
Allen-Bradley Co., 493 Clinton, Milwaukee, Wis.
Amacostat. See American Apparatus Co.
American Apparatus Co., Richmond, Ind.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Automotive Equipment Co., 317 Halsey, Newark, N. J.
B. M. S. See Brooklyn Metal Stamping Corp.
Beaver Mfg. Co., 635 N. Third, Newark, N. J. (Multiple Plugs.)
Benjamin Elec. Mfg. Co., Des Plaines (Chicago Suburb), Ill.
Brach Mfg. Corp., L. S., 120 Sussex Ave., Newark, N. J.
Brooklyn Metal Stamping Corp., 718 Atlantic Ave., Brooklyn
Cabelug. See Jones, Howard B.
Carter Radio Co., Div. of Utah Radio Products Co., 18th & Michigan Ave., Chicago, Ill. (Also Socket Adapters.)
Cinch Mfg. Corp., 2335 W. Van Buren, Chicago, Ill.
Clarostat Mfg. Co., 281 N. Sixth, Brooklyn, N. Y.
Cle-Ha-Tone. See Benjamin Elec. Mfg. Co.
D. A. Radio Co., 80 Hollister, Buffalo, N. Y.
De Jur-Amsco Corp., 95 Morton, New York, N. Y.
Dongan Elec. Mfg. Co., 2985 Franklin, Detroit, Mich.
Duostat. See De Jur-Amsco Corp.
Dynodiler Mfg. Co., 1923 E. 178th, New York, N. Y. (Interference Eliminator).
Eby Mfg. Co., H. H., 22nd & Lehigh Ave., Philadelphia.
Electrad, Inc., 178 Varick, New York, N. Y.
Electrical Insulation Corp., 308 W. Washington, Chicago
Fantail Plug. See Brooklyn Metal Stamping Corp.
Frost, Herbert H., 1142 W. Beardsley, Elkhart, Ind.
Gem-Jac. See Frost, Herbert H.
General Instrument Corp., 225 Varick, New York, N. Y
General Radio Co., 30 State, Cambridge, Mass.
Gray & Danielson Mfg. Co., 2101 Bryant, San Francisco,
Heinemann Elec. Co., Penn Ave. & Plum, Trenton, N. J.
Imp. See Carter Radio Co.
Jones, Howard B., 2300 Wabansia, Chicago. (Multiple Plug)
Marion Elect. Mfg. Co., 24 Cliff, Jersey City, N. J.
Martin-Copeland Co., 101 Sabin, Providence, R. I.
Microgrid. See Pilot Radio & Tube Corp.
Morse Co., Frank W., 391 Congress, Boston, Mass.
Nutmeg. See Hart & Hegeman, Div. of Arrow-Hart & Hegeman Elec. Co.
Pacent Elec. Co., 91 Seventh Ave., New York, N. Y.
Pan-Tab Jack See Frost, Herbert H.
Pilot Radio & Tube Corp., Lawrence Mass.
Premier Elec. Co., 3800 Ravenswood Ave., Chicago, Ill.
Recto Mfg. Co., Appleton & B.&O. R.R., Cincinnati, O.
Robertson-Davis Co., 361 W. Superior, Chicago, Ill.
Royalty See Electrad, Inc.
Samson Elec. Co., Canton, Mass.
Shallcross Mfg. Co., Collingdale, Pa.
Socostat. See D. A. Radio Co.
Workrite Radio Corp., 1838 E. 30th, Cleveland, O.

RADIO RECTIFIER TUBES

Armstrong Electric Co., 187 Sylvan Ave., Newark, N. J.
Arcturus Radio Tube Co., 720 Frelinghuysen Ave., Newark, N. J.
Audion. See De Forest Radio Co.
Cable Radio Tube Corp., 80 N. Ninth, Brooklyn, N. Y.
Ceco Mfg. Co., 1200 Eddy, Providence, R. I.
Robertson-Davis Co., 363 W. Superior, Chicago, Ill.
Cunningham, Inc., E. T., 370 Seventh Ave., New York, N. Y
Daven Co., 158 Summit, Newark, N. J.
DeForest Radio Co., Passaic, N. J.
Diamond Electric Co., Newark, N. J.
Diamond Vacuum Products Co., 4059 Diversey Ave., Chicago
Dietron. See Diamond Vacuum Products Co.
Eveready Raytheon. See National Carbon Co.
Gold Seal Electrical Co. of Ohio, Inc., 250 Park Ave., New York, N. Y
Hygrade Lamp Co., Salem, Mass.
Hytron Corp., Salem, Mass.
Jaeger Research Laboratories, 280 Park Ave., Woehawken, N. J.
Ken-Rad Tube & Lamp Corp., Owensboro, Ky.
National Carbon Co., 30 E. 42nd, New York, N. Y.
National Union Radio Corp., 400 Madison Ave., New York.
Neptron. See Hygrade Lamp Co.
Paramount Mfg. Co., 79 Orange, Newark, N. J.

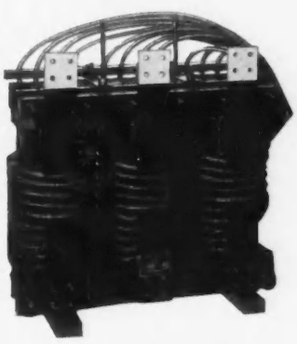
Fractional Horsepower MOTORS

Universal and induction type small fractional horsepower motors to meet all requirements, wherever small motors are needed. Send us your specifications—no obligations.

Signal Electric Mfg. Co.
Menominee, Michigan

Small motor specialists since 1890

SIGNAL



KENYON TRANSFORMERS
1 to 200 KVA
▼
DISTRIBUTION POWER
and
SPECIAL APPLICATIONS
AIR and OIL-COOLED
▼
KENYON TRANSFORMER COMPANY, INC.
122 Cypress Ave., N. Y. C.

"I was brought up in the commutator business under the stern Cameron rule that controls the kind of materials and workmanship that are built into Cameron Commutators—and, you can take it from me, that's *some* rule.

"That rule makes certain that every Cameron Commutator built is as near 100% as experience and the newest methods can make it.

"Yes, and I get a big kick out of the fact that Cameron never disappoints in an emergency commutator repair job. A 24-hour emergency repair service takes care of that."

THE CAMERON ELECTRICAL MFG. CO.
Ansonia, Conn.

ETL Know by Test

Testing of Electrical Materials

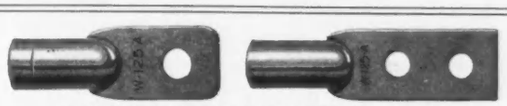
for

A written report to each client

Testing Appliance Cord Sets

Dielectric Strength
High Voltage Breakdown
Conductivity and Resistance
Chemical Composition
Mechanical Strength
Microscopic Structure
Wearing Qualities
Operating Characteristics

ELECTRICAL TESTING LABORATORIES
80th St. and East End Ave., New York



WOLVERINE SOLDERING LUGS

Heavy duty, high efficiency, accurate lugs—tinned or plain—from seamless deoxidized copper tubing. Listed as standard by Underwriters' Laboratories.

A complete line to meet all requirements. Quick delivery from stock. Send for price list.

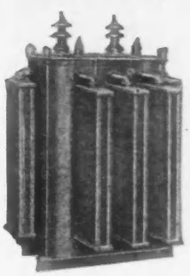
Write for Catalogs

WOLVERINE TUBE CO.

SEAMLESS COPPER BRASS & ALUMINUM

1431 Central Ave. Detroit, Michigan

Pedigree Insulating Varnish



Particularly Adaptable to the Electrical Industry

THE most massive installation and most commonplace transformer alike depend for longevity on perfect dielectric protection.

Insulate your product with the tenacious armor of PEDIGREE Varnish or Compound, and you seal the surface for a long, serviceable life.

PEDIGREE insulating products do not yield to the action of heat, moisture, acids and alkalies, and have the greatest wet and dry dielectric strength.

Samples of PEDIGREE insulating varnishes and compounds sent on request.

THE P. D. GEORGE COMPANY
Saint Louis Missouri

RADIO RECTIFIER TUBES—Continued
Pentode. See Ceco Mfg. Co.
Perryman Electric Co., 4901 Hudson Blvd., North Bergen, N. J.
Radio-Victor Corp. of America, 233 Broadway, New York.
Schiller, Inc., J. A., 500 Chancellor Ave., Irvington, N. J.
Specialty Appliance Co., 6611 Euclid Ave., Cleveland, Ohio.
Sylvania Products Co., Emporium, Pa.
Van Horne Tube Co., 230 Center, Franklin, Ohio.
RADIO TRANSFORMERS. See Radio Circuit Components
RADIO TUBE BASE BRANDERS. See Engraving Radio Panel.
RADIO TUBE BASES. See Radio Molded Parts.
RADIO TUBE BULBS (Unfinished). See Bulbs, Glass

RADIO TUBE PARTS

Filament Hooks, Mesh Plates, Special Bolts & Nuts, Stampings, etc.
Callite Products Co., 534 39th, Union City, N. J.
Goat Radio Tube Parts, Inc., 33 35th, Brooklyn, N. Y. (Screens.)
Juno Fasteners, Inc., Hillside, N. J.
Newark Plate Laboratories, 223 Jelliff Ave., Newark, N. J. (Mesh Plates.)
Newark Wire Cloth Co., 351 Verona Ave., Newark, N. J. (Screens).

RADIUM POWDER AND PAINT

Radium Dial Co., 3552 Forbes, Pittsburgh, Pa.
Undark. See United States Radium Corp.
United States Radium Corp., 535 Pearl, New York, N. Y.
RANGE SWITCHES, Rotary Snap. See Switches, Snap Heavy Duty.
RAWHIDE GEARS. See Gears & Pinions, Rawhide.
READING LAMP BASES. See Bases, Reading Lamp.
REAMERS, Pipe. See Stocks, Dies and Reamers.
RECEPTACLES, Lamp. See Sockets and Receptacles.

RECEPTACLES, Plug, Heavy Duty

	KEY
Battery Charging	See B
Floor Boxes	See F
Welding	See W
Machine Tool	See W
Watertight, Marine, Mine	See M
Car Trailer Connection	See C
Extension	See E

A. B. C. See Anderson Mfg. Co.												
Adam Electric Co., Frank, St. Louis, Mo.	F											
Adapti Co., 2596 E. 72nd, Cleveland, O.	F											
Anderson Mfg. Co., Albert & J. M., 289 A Boston, Mass.			B	W	M			E				
Appleton Elec. Co., 1703 Wellington Ave., Chicago, Ill.							M					
Arktite. See Crouse-Hinds Co.												
Arnessen Electric Co., 13 Water, New York							M					
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.			F	B	W							
Auth Electrical Specialty Co., 422 E. 53rd, New York, N. Y.												E
Benjamin Elec. Mfg. Co., Des Plaines, Ill.	F			W	M							
Bryant Elec. Co., 1421 State, Bridgeport, Conn. (Also Range Type.)				W								
Campbell. See Steel City Elec. Co.												
Cannon Elec. Development Co., 420 West Ave., 33, Los Angeles, Cal.	F											
C. E. M. Co. See Conn. Elec. Mfg. Co.												
C. H. See Cutler-Hammer Mfg. Co.												
Circle F Mfg. Co., Trenton, N. J.							M					
Conduletto. See Crouse-Hinds Co.												
Connecticut Elec. Mfg. Co., Bridgeport, Conn.	F											
Cory & Son, Chas., 183 Varick, New York							M					
Crouse-Hinds Co., Syracuse N. Y.			B	W								
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee, Wis.	F											
Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.								C				
Fielding. See Stanley & Patterson.												
Fountain's. See Jenkins Mfg. Co.												
Fullman Mfg. Co., Latrobe, Pa.	F				M							
Fullman. See Steel City Elec. Co.												
General Elec. Co., Section W-329, Bridgeport, Conn.			B									
Gleason & Co., J. L., 241 Franklin, Boston, Mass.												E
Groundsafe. See Novelty Electric Co.												
H. & H. See Arrow-Hart & Hegeman Elec. Co.												
Hessel Co., W. F., 76 Greenwich, New York, N. Y.					W	M		E				
Hubbell, Inc., Harvey, Bridgeport, Conn. (Also Range Type.)			B	W								
Indestructible. See Kliegl Bros. Universal.												
Jenkins Mfg. Co., Bloomfield, N. J.								E				
Kliegl Bros. Universal Elec. Stage Lighting Co., 321 W. 50th, New York, N. Y.	F	B	W	In								
Latrobe. See Fullman Mfg. Co.												
Lexington Electric Products Co., 12 Chapel, Newark, N. J.												
Loeffelholz & Co., Milwaukee, Wis.								C				
Major Equipment Co., 4803 Fullerton Ave., Chicago, Ill.							M					
Neco. See Novelty Elec. Co.												
NePage McKenny Co., 804 Sixth Ave., S. Seattle, Wash.	F											
Novelty Elec. Co., Tenth & Cherry Sts., Philadelphia, Pa.								C				
Ostrander Elect. Works, W. R., 911 Atlantic Ave., Brooklyn, N. Y.												
Perfins. See Bryant Elec. Co.												
Porto. See Hessel Co., W. F.												
Preset. See Walker Bros. Co.												
Pyle National Co., 1334 N. Kostner Ave., Chicago, Ill.					W	M	C	E				
Quadrangle Mfg. Co., 32 S. Peoria, Chicago, Ill. (Combination wall bracket and convenience outlet.)												
Raleo Mfg. Co., 123 N. Albany Ave., Chicago, Ill.												
Russell & Stoll Co., 53 Rose, New York	F		B	W	M			E				
Square D Co., Detroit, Mich.				W								
Stanley & Patterson, 150 Varick, New York, N. Y.	F											
Steel City Elec. Co., 1207 Columbus Ave., Pittsburgh, Pa.	F							E				
Thomas & Betts Co., 15 Park Place, New York, N. Y.	F											
V. V. Fittings Co., 711 Cherry, Philadelphia, Pa.							M					
Walker Bros., 12 E. 41st St., New York, N. Y.	F							E				
Weldomatic. See Westinghouse Elec. & Mfg. Co.												
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.	F	B	W	M								
Yale. See Electric Products Co.												

RECORDERS, Elapsed Time. See Indicators, Operation.
REDUCERS, Socket. See Socket Reducers.
REFLECTOR LENSES. See Lenses.

REFLECTORS, Chromium Plated, Metal

Ace Auto Lamp Co., Amesbury, Mass.

REFLECTORS, Porcelain Enameled, Steel

ABolite Reflector Co., West Lafayette, Ohio.
Benjamin Elec. Mfg. Co., Des Plaines (Chicago Suburb), Ill.
Dunlap Co., John, Hammond & Gregg, Carnegie, Pa.
Duratach. See Wheeler Reflector Co.
Durex. See Wheeler Reflector Co.
Elkay Reflector Corp., 98 Grand Ave., Brooklyn, N. Y.
Faries Mfg. Co., Decatur, Ill.
Federal Electric Co., 8700 S. State, Chicago, Ill.
Goodlites. See Goodrich Elec. Co.
Goodrich Elec. Co., 2935 N. Oakley Ave., Chicago, Ill.
Isolux. See Wheeler Reflector Co.
Jumbo. See Quadrangle Mfg. Co.
Marbelite Art Products Co., 1[illegible] N. Robey, Chicago, Ill.
Monk, H. E., 18 Warren, New York, N. Y.
Multi Elect. Mfg. Co., 210 N. Ogden Ave., Chicago, Ill.
Oamaco. See Overbaugh & Ayers.
Overbaugh & Ayers Mfg. Co., 411 S. Clinton, Chicago, Ill.
Para Steel. See Wheeler Reflector Co.
Perfection. See Tindall & White.
Quad. See Quadrangle Mfg. Co.
Quadrangle Mfg. Co., 32 S. Peoria, Chicago, Ill.
Reliability. See ABolite Reflectors Co.
Richardson Reflector Co., 16 Hudson, New York, N. Y.
Sturdox. See Benjamin Elec. Mfg. Co.
Tindall & White, 33 W. 60th, New York, N. Y.
Vapalux. See Wheeler Reflector Co.
Westinghouse Elec. & Mfg. Co., South Bend, Ind.
Wheeler Reflector Co., 275 Congress, Boston, Mass.
REFRACTORIES, Porcelain. See Cores Resistance Coil.
REFRIGERANTS. See Chemicals, Refrigeration.
REFRIGERATION CHEMICALS. See Chemicals, Refrigeration.

REFRIGERATOR CABINETS

Alaska Refrigerator Co., Muskegon, Mich.
Arlington Refrigerator Co., Arlington, Vt.
Baldwin Refrigerator Co., Burlington, Vt.
Belding-Hall ElectrICE Corp., Belding, Mich.
Benjamin Elec. Mfg. Co., Des Plaines, Ill.
Bohn Refrigerator Co., 1340 University Ave., St. Paul, Minn.
Cavalier. See Tennessee Furniture Co.
Champion Refrigerator Co., 206 Lexington Ave., New York.
Crystal Refrigerator Co., Fremont, Neb.
Crysteel. See Benjamin Elec. Mfg. Co.
Dry-Air. See Baldwin Refrigerator Co.
Eddy & Sons Co., D., 336 Adams, Boston, Mass.
Erie Art Metal Co. & Erie Metal Furniture Co., Erie, Pa.
General Necessities Corp., General Necessities Bldg., Detroit, Mich.
Gibson Refrigerator Co., Greenville, Mich.
Gloekler Co., Bernard, 1627 Penn Ave., Pittsburgh, Pa.
Harder Refrigerator Corp., Cobleskill, N. Y.
Heintz Mfg. Co., Front & Olney Aves., Philadelphia, Pa.
Heinz & Munschauer, Superior and Randall, Buffalo, N. Y.
Herrick Refrigerator Co., 1803 River, Waterloo, Iowa.
Hubbard Cabinets, Inc., 6504 Euclid Ave., Cleveland, O.
Hudderle Bros., Inc., 329 Exchange, Rochester, N. Y.
Howe Scale Co., Rutland, Vt.
Hudson. See Harder Refrigerator Corp.
Jewett Refrigerator Co., Buffalo, N. Y.
Kingston. See Lorillard Refrigerator Co.
Kleen Kold. See Harder Refrigerator Corp.
Knox. See Erie Art Metal Co.
Leonard Refrigerator Co., Div. of Kelvinator Corp., 14204 Plymouth Rd., Detroit, Mich.
Liver & Co., C. B., Omaha, Neb.
Loeber Co., Henry G., 151 E. 126th, New York, N. Y. (Ice Cream Cabinet.)
Lorillard Refrigerator Co., 40 Cooper Square, New York.
Louisville Refrigerator Corp., 4460 Louisville Ave., Louisville, Ky.
Louisville Tin & Stove Co., Louisville, Ky.
Mace & Co., L. H., 55 E. 150th, New York, N. Y.
McCray Refrigerator Sales Corp., 2664 Lake St., Kendallville, Ind.
Mowatt Refrigerator Co., 25 Oak Grove, San Francisco, Cal.
Niagara. See Heinz & Munschauer.
Omaha Fixture & Supply Co., 11th and Douglas, Omaha
Oreole. See Ottenheimer Bros.
Ottenheimer Bros., Baltimore, Md.
Reol. See Ottenheimer Bros.
Reolite. See Ottenheimer Bros.
Sanitor. See Bohn Refrigerator Co.
Schmidt Co., C., John and Livingston, Cincinnati, O.
Seeger Refrigerator Co., Arcade and Wells Sts., St. Paul, Minn.
Steeprest. See Heintz Mfg. Co.
Success Mfg. Co., Gloucester, Mass.
Syphon. See Bohn Refrigerator Co.
Tennessee Furniture Co., Chattanooga, Tenn.
Vogt. See General Necessities Corp.
Ward Refrigerator Co., 6901 S. Alameda, Los Angeles, Cal.
White Mountain. See Maine Mfg. Co.
White Seal. See Louisville Refrigerator Co.
REFRIGERATOR CONDENSER UNITS. See Condenser Units, Refrigerator.

REFRIGERATOR FITTINGS

Commonwealth Brass Corp., Commonwealth Ave. & G. T. R. R., Detroit, Mich.

REGULATORS, Temperature

American Radiator Co., 40 W. 40th, New York, N. Y. (Mercury Switch Type.)
American Teletherm Co., 1017 Summit, Toledo, O.
American Thermostat Co., 226 Jelliff Ave., Newark, N. J.
Automatic Electric Heater Co., 1524 Race, Philadelphia, Pa. (Furnace.)
Automatic Reclosing Circuit Breaker Co., Columbus, O.
Bake-O-Meter. See Cooper Oven Thermometer Co.
Boston Machine Wks. Co., 7 Willow, Lynn, Mass.
Bristol Co., Plattes Bridge & Naugatuck Rd., Waterbury, Conn.
Brown. See Electric Automatic Appliance Co.
Brown Instrument Co., Wayne & Windrim, Philadelphia.
Ceaco. See Cobb Electric Appliance Co.
Cobb Electric Appliance Co., 100 Massachusetts Ave., Boston.
Cooper Oven Thermometer Co., Pequabuck, Conn.
Davis & Daggett Co., 238 Dwight, Springfield, Mass.
Duo-Stat. See Raymond Co.
D. & T. Manufacturing Co., 3001 La Salle, St. Louis, Mo.
Dunco. See Struthers Dunn, Inc.
Electric Automatic Appliance Co., 1748 Arapahoe, Denver, Colo.
Engelhart, Chas., 90 Chestnut, Newark, N. J.
Gifford Heat Control Systems, 1 Broadway, New York.
Gold Car Htg. & Ltg. Co., 220 36th, Brooklyn, N. Y.
Hart Mfg. Co., Hartford, Conn.
Hermansen Elect. Co., 505 W. 41st, New York, N. Y.
Hynes & Cox Elec. Corp., 456 N. Pearl, Albany, N. Y.
Johnson Service Co., 149 Michigan, Milwaukee, Wis.
Lockswitch. See Time-O-Stat Controls Co.
Majestic Electric Appliance Co., San Francisco, Cal.
Marvel. See American Thermostat Co.
Mercoid Corp., 4201 Belmont Ave., Chicago, Ill. (Mercury Switch.)
Minneapolis-Honeywell Regulator Co., 2753 Fourth Ave., Minneapolis, Minn.
Penn Electric Switch Co., E. 20th & Walnut Sts., Des Moines, Iowa.
Protectostat. See Minneapolis-Honeywell.
Quick Freeze. See Penn Electric Switch Co.
Ranco. See Automatic Reclosing Circuit Breaker Co.
Raymond Co., F. I., 228 N. La Salle, Chicago, Ill.
Savutime Devices, Inc., 88 Manhattan, Rochester, N. Y.
Simplex Heat Regulator, 2938 Pillsbury Ave., Minneapolis
Snapon. See Tagliabue Mfg. Co.
Struthers Dunn, Inc., 138 N. Juniper, Philadelphia, Pa.
Sure Fire. See Boston Machine Wks.
Tagliabue Mfg. Co., C. J., 18 33rd, Brooklyn, N. Y.
Time-O-Stat Controls Co., Elkhart, Ind.
Trent Co., Harold E., 439 N. 12th, Philadelphia, Pa.
Webster Elec. Co., Racine, Wis.
White Mfg. Co., 2362 University Ave., St. Paul, Minn.
Wilcolator Co., Newark, N. J.
Wilson-Maeulin Co., 383 Concord Ave., New York, N. Y.

REGULATORS, Voltage

American Instrument Co., 774 Girard, N. W., Washington, D. C.
Anderson & Co., C. J., 212 W. Austin Ave., Chicago, Ill.
Marshall Electric Co., Elkhart, Ind.
Rotor. See Ward-Leonard Electric Co.
Stater Co., 19 New Park Ave., Hartford, Conn.
Ward Leonard Electric Co., Mount Vernon, N. Y.

RELAYS

(See also Circuit Breakers and Thermostats.)
Allen Bradley Co., 493 Clinton, Milwaukee, Wis.
American Brown Boveri Elec. Corp., Camden, N. J.
Automatic Switch Co., 154 Grand, New York, N. Y.
Benjamin Elec. Mfg. Co., Des Plaines, Ill.
Burkaw, Inc., 30 Court, Newark, N. J.
Burke Controller Co., 369 Lexington Ave., New York, N. Y.
Electric B-G Products Co., Ithaca, Mich.
Dunco. See Struthers Dunn, Inc.
General Electric Co., Schenectady, N. Y.
G-M Laboratories, Inc., Grace & Ravenswood Ave., Chicago.
Grid Glow. See Westinghouse Elec. & Mfg. Co.
Leach Relay Co., 860 S. Los Angeles, Los Angeles, Cal.
McWilliams. See Electric B-G Products Co.
Roller-Smith Co., 239 Broadway, New York, N. Y.
Signal Engineering & Mfg. Co., 154 W. 14th, New York.
Struthers Dunn, Inc., 138 N. Juniper, Philadelphia, Pa.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Wilcolator Co., Newark, N. J.
REMOTE CONTROL SWITCHES. See Switches, Remote Control.

REMOVERS, Coil

Ewing Mfg. Company, Middleport, Ohio.
RESINOID PLASTICS. See Molded Insulation.

RESISTANCE

Boxes. See Instruments, Laboratory Standard
Coil Cores. See Cores, Resistance.
Test Sets. See Instruments
Units, Radio. See Radio Circuit Components
Units. See Units, Rods & Grids.
Wire. See Wire Bare.

RESISTORS

Hardwick, Hindle, Inc., 216 Emmett, Newark, N. J.
Ohmite Mfg. Co., 629 N. Albany Ave., Chicago, Ill.
Ward Leonard Electric Co. Mount Vernon, N. Y.

RESISTORS. See Units, Rods & Grids.
RESURFACERS, Commutator. See Stones, Commutator, also Tools, Commutator Truing.
REVOLUTION COUNTERS. See Tachometers.

RHEOSTATS.

Motor-Controlling. See Controllers, also Rheostats
Radio. See Radio Receiver Parts.
Sewing Machine. See Controllers.

RHEOSTATS

	KEY
Battery Charging	See B
Stage Dimming	See D
Meter Testing (Laboratory)	See L
Plating Tank	See P
Motion Pictures (Projector Lamp)	See M
Motor Starting, Field and Speed Regulating	See F

	F	B	D	P	M	L
Allen-Bradley Co., 493 Clinton, Milwaukee						L
Beck Bros., 421 Sedgley Ave., Philadelphia, Pa.						L
Biddle, James G., 1209 Arch, Philadelphia						L
Brach Mfg. Corp., L. S., Newark, N. J. (Radio Battery Control.)		B				
Bradleystat. See Allen-Bradley Co.						
Columbia Electric Mfg. Co., 1292 E. 53rd, Cleveland, O.				P		
Controlite. See Ward Leonard Elec. Co.						
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee, Wis.	F	B	D			L
Economic Rheostat Switch Co., 3551 N. 5th, Philadelphia, Pa.	F					
Electric Controller & Mfg. Co., 2700 E. 79th, Cleveland, O.	F					
Electric Products Co., 1725 Clarkstone Rd., Cleveland, O.		B				
General Electric Co., Schenectady, N. Y.	F					L
Hanson-Van Winkle-Munning Co., Matawan, N. J.				P		
Hardwick, Hindle, Inc., 215 Emmett, Newark, N. J.	F	B	D			L
Holzmuller, C. J., 1108 Howard, San Francisco, Cal.			D			
Kliegl Bros. Universal Elec. Stage Lighting Co., 321 W. 50th, New York, N. Y.			D		M	
Knoeller Elec. Co., De Pere, Wis.	F					
National Elec. Controller Co., 5315 Ravenswood Ave., Chicago	F	B	D		M	L
Optimus. See Hanson-Van Winkle-Munning Co.						
New York, N. Y.					M	
Robertson, Lee F., Inc., 532 W. 22nd, Rubicon Co., 29 N. Sixth, Philadelphia						L
Schaefer Bros. Co., 1059 W. 11th, Chicago	F	B	D		M	
Simplicity. See Cutler-Hammer Mfg. Co.						
Universal. See Ward Leonard Elec. Co.						
Vitrohm. See Ward Leonard Elec. Co.						
Ward Leonard Elec. Co., Mt. Vernon, N. Y.	F		D		M	
Wotton. See Electric Products Co.						
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.	F				M	

RINGS Seal. See Packing

Nothing but.... COILS

Coils, Inc., specialize in precision, layer wound coils up to No. 36 wire, tape wound, and cotton interwoven coils.

We are equipped to manufacture coils to any exacting specifications for the radio and electrical industry. Here are illustrated a few of our products.

Tell us your coil problems and we will specify the right coil for the purpose.

COILS, INC.

1183 Eddy Street
PROVIDENCE, R. I.

Floodlamps and Spotlamps Ruggedly Made from Heavy-gauge Brass.

Chromium-plated Reflectors.

Dust and Water-tight.

Type PF-91

AGALITE

TRADE MARK

Type shown takes standard lamps up to 500 watts — other types for lamps of greater wattage.

Write AGA engineering department for details.

AGA AUTO LAMP CO., Inc.

Successors to Gray & Davis, Inc., Lamp Division

AMESBURY, MASS.

DIE CAST by ALLIED HEAT

An almost indispensable Ally when harnessed for Household and Factory use — it quickly becomes an enemy when not properly controlled or resisted.

Producing burner tips made of an alloy that allows sufficient strength and at the same time a high resistance to heat is just one of the ways in which the Allied Process is serving mankind. Others lie in the simplification and the high speed low cost production of parts that are produced as accurate, strong and finely finished as those produced by far more expensive methods.

To all those who are interested in the production economies possible by the die casting art—the Allied Die Caster, a magazine devoted to the application of this science in modern industry, will be sent without obligation. A letter from you on your business stationery will bring The Die Caster regularly—free of charge.

Address The Allied Die Casting Corp., 43rd Ave. from 38th to 39th Streets, Long Island City, N. Y.

ALLIED
DIE-CAST

RIVETS
Aluminum Co. of America, 2444 Oliver Bldg., Pittsburgh.
American Brass Co., Waterbury, Conn.
Blake & Johnson Co., 1497 Thomaston Ave. (Waterville), Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Rivet & Specialty Co., 1830 S. 54th, Chicago, Ill.
Hassall, Inc., John, 402 Oakland, Brooklyn, N. Y.
Hungerford Brass & Copper Co., Div. of The Chase Brass Companies, Inc., 88 Lafayette, New York, N. Y.
Manufacturers Belt Hook Co., 1315 W. Congress, Chicago, Ill.
Nelson Rivet Co., Taunton, Mass.
Stimpson Co., Edwin B., 70 Franklin Ave., Brooklyn, N. Y.
Thomson Mfg. Co., Judson L., Waltham, Mass.
Tubular Rivet & Stud Co., 57 Lincoln, Boston, Mass.
Waterbury Brass Goods Co., Waterbury, Conn.
Wright & Carson Mfg. Co., Bridgeport, Conn.
RODS, Resistance. See Units, Rods and Grids.
ROLLER BEARINGS. See Bearings, Ball and Roller.

ROLLS, Coil Flattening
Columbia Machine Works & Malleable Iron Co., 263 Chestnut, Brooklyn, N. Y.
RUBBER BELTS. See Belts, Rubber.

RUBBER, Hard
Hard Rubber, Ebonite, Vulcanite.
Aetna Rubber Co., Ashtabula, O.
American Hard Rubber Co., 11 Mercer, New York, N. Y.
Connecticut Hard Rubber Co., West Haven, Conn.
Goodrich Rubber Co., B. F., Akron, O.
Insuline Corp. of America, 78 Cortlandt, New York, N. Y.
Luzerne Rubber Co., Muirhead, near Dewey, Trenton, N. J.
Mahoganite. See American Hard Rubber Co.
New York Hard Rubber Turning Co., 212 Centre, New York.
Panelyte Corp., Lincoln Bldg., New York, N. Y.
Radiolite. See Superior Hard Rubber Co.
Stokes Rubber Co., Jos., Trenton, N. J.
Superior Hard Rubber Co., Butler, N. J.
United States Rubber Co., 1790 Broadway, New York, N. Y.
Vulcanized Rubber Co., 251 4th Ave., New York, N. Y.
Vulco Panels. See Vulcanized Rubber Co.

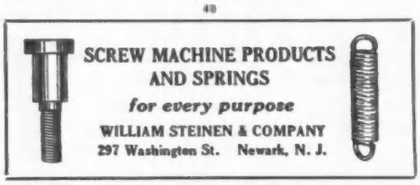
RUBBER, MECHANICAL GOODS
Goodrich Rubber Co., B. F., Akron, O.
Manhattan Rubber Mfg. Co., Willet, Passaic, N. J.
Rodale Mfg. Co., Emaus, Pa.
Sun Rubber Co., Barberton, O.
Toycraft Rubber Co., Dept. W., Ashland, O.
RUBBER, SEMI-HARD. See Rubber Mechanical Goods.

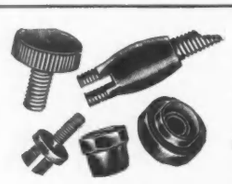
RUBBER, Sponge
Sun Rubber Co., Barberton, O.
Toycraft Rubber Co., Dept. W., Ashland, O.
RUBBER TAPE. See Tape, Rubber and Friction.
RUBBER TUBING. See Tubing, Rubber.
RUST PROOFING. See Plating & Finishing.
SAL AMMONIAC. See Chemicals, Battery.
SALTS, Battery. See Chemicals, Battery.
SATURATING TANKS. See Wire Manufacturing Machines
SCREW SHELLS, Socket. See Shells, Screw Socket.

SCREW DRIVING MACHINES
Vim Electric Tool Co., 149 Broadway, New York, N. Y

SCREW MACHINE PRODUCTS
American Metal Wks., 4865 Stenton Ave., Philadelphia, Pa.
Arrow Automatic Products Corp., 27 Vestry, New York.
Barnes Co., Wallace, Bristol, Conn.
Belco. See Bell Co., David.
Bell Co., David, 1555 Fillmore Ave., Buffalo, N. Y. (Special Parts.)
Blake & Johnson Co., 1497 Thomaston Ave., Waterville.
Blake & Johnson Co., 1497 Thomaston Ave. (Waterville), Waterbury, Conn.
Bridgeport Brass Co., 774 E. Main, Bridgeport, Conn.
Brighten Screw & Mfg. Co., 1456 Harrison Ave., Cincinnati, O.
Callite Products Co., 534 39th, Union City, N. J.
Cameron Elect. Mfg. Co., Ansonia, Conn.
Chapman Machine Co., Terryville, Conn.
Chase Brass & Copper Co., Waterbury, Conn
Colonial-Premier Co., 229 W. Ohio, Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Corbin Screw Corp., 226 High, New Britain, Conn.
Eastern Machine Screw Corp., New Haven, Conn.
Eureka Tool & Machine Co., 42 Walnut, Newark, N. J.
Faries Mfg. Co., Decatur, Ill.
Fruland Chain & Mfg. Co., Springfield, Mass.
Great Western Mfg. Co., La Porte, Ind.
Hanson, Einar R., 17 Hermon, Worcester, Mass.
Hartford Machine Screw Co., 476 Capitol Ave., Hartford, Conn.
Hassall, Inc., John, 402 Oakland, Brooklyn, N. Y.
Hubbell, Inc., Harvey, Bridgeport, Conn.
Jamaican Mfg. Co., Forestville, Conn.
Interstate Products Corp., 503 Mulberry, Newark, N. J.
Linden & Co., 891 Broad, Providence, R. I.
Mattatuck Mfg. Co., Waterbury, Conn.
Meisel Press Mfg. Co., 944 Dorchester Ave., Boston, Mass.
Namco. See National Acme Co.
National Acme Co., 131st & Cart, Cleveland, O.
Olson Mfg. Co., 56 Commercial, Worcester, Mass.
Parent Machine & Screw Co., 50 Canal, Salem, Mass.
Peck Spring Co., Plainville, Conn.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago, Ill.
Plume & Atwood Mfg. Co., 474 Bank, Waterbury, Conn
Progressive Mfg. Co., Torrington, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Screw Machine Products Corp., Providence, R. I.
Shimer & Sons, Samuel J., Milton, Pa.
Steiner & Co., 297 Washington, Newark, N. J.
Thomaston Mfg. Corp., Thomaston, Conn.
Walden Tool & Metal Mfg. Co., 3 Oxford, New Haven, Conn.
Watkins Co., D. M., 270 Pine, Providence, R. I.
Waterbury Brass Goods Corp., Waterbury, Conn
Wilmington Fibre Specialty Co., Wilmington, Del.
Wright Machine Co., 79 Armory, Worcester, Mass.

SCREWS, Cap (Cut Thread)
Bristol Co., Waterbury, Conn.
Hartford Machine Screw Co., Hartford, Conn.
Namco. See National Acme Co.
National Acme Co., 131st & Cart, Cleveland, O.
Steelcraft. See United Screw & Bolt Corp.
United Screw & Bolt Corp., Cleveland, O.


SCREW MACHINE PRODUCTS AND SPRINGS
for every purpose
WILLIAM STEINEN & COMPANY
297 Washington St. Newark, N. J.


Screw Machine Products
UP TO 2¼ in. DIAMETER
OLSON MFG CO.
56 Commercial St.
WORCESTER, MASS.

SCREWS, Drive
Hassell, Inc., John, 402 Oakland, Brooklyn, N. Y.
Parker-Kalon Corp., Dept. K., 190 Varick, New York, N. Y.

SCREWS, Machine
Blake & Johnson Co., 1497 Thomaston Ave. (Waterville), Waterbury, Conn.
Chicago Nut Mfg. Co., 2513 Cullerton, Chicago, Ill.
Clark Metal Products, Inc., 490 Hancock Ave., Bridgeport, Conn.
Elco Tool & Screw Corp., 1818 Broadway, Rockford, Ill.
Hassall, Inc., John, 402 Oakland, Brooklyn, N. Y.
Hubbell, Inc., Harvey, Bridgeport, Conn.
Namco. See National Acme Co.
National Acme Co., 131st & Cart, Cleveland, O.
New England Screw Co., Dept. A, 44 Farnsworth, Boston.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago, Ill.
Progressive Mfg. Co., Torrington, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Screw Machine Products Corp., Providence, R. I.
Steelcraft. See United Screw & Bolt Corp.
Strong, Carlisle & Hammond, 1392 W. Third, Cleveland, O
United Screw & Bolt Corp., Cleveland, O.

SCREWS, Machine (Cut Thread)
American Screw Co., Providence, R. I.
SECOHMMETERS. See Instruments, Laboratory Standard
SEGMENTS. See Discs, Armature.

SEPARATORS, Storage Battery
Campbell Elec. Co., Kansas City, Mo.
Carlile & Doughty, 2530 N. Broad, Philadelphia, Pa.
Chattanooga Battery Box Co., Chattanooga, Tenn.
Certified. See Ermet Products Co.
Ermet Products Co., Sherman Drive & 16th, Indianapolis, Ind. (Wood.)
Estes & Sons, E. B., 25 Vanderbilt Ave., New York. (Wood.)
Indianapolis Box & Separator Co., 2101 Yandes, Indianapolis, Ind. (Wood.)
Indianapolis Mfg. Co., Indianapolis, Ind.
Inseco. See Indianapolis Box & Separator Co.
Link & Eisenrich, Inc., 555 W. 52nd, New York, N. Y.
Red Band. See Indianapolis Mfg. Co.
Stewart Mfg. Co., Wm. E., 14th & Elm, Flint, Mich. (Wood.)
Wick Lumber Co., R., 539 W. 52nd, New York. (Wood.)

SHADES
Aluminum. See Shades, Metallic.
Asbestos. See Shades, Fabric.
Bamboo. See Shades, Fabric.
Brass. See Shades, Metallic.
Cast Metal. See Shades and Domes.
Copper. See Shades Metallic.
Cretonne. See Shades, Fabric.
Leaded. See Shades and Domes.
Leather. See Shades, Fabric.
Linen. See Shades, Fabric.
Mica. See Shades, Mica.
Molded. See Molded Insulation.
Mosaic. See Shades and Domes.
Parchment. See Shades, Fabric.
Paper. See Shades, Fabric.
Silk. See Shades, Fabric.
Stamped Metal. See Shades, Metallic; also Shades and Domes.
Steel. See Shades, Metallic.
Tin. See Shades, Metallic.
Zinc. See Shades, Metallic.

SHADES, Fabric
Asbestos Cretonne, Leather, Linen, Paper, Silk, Bamboo Parchment.
Adelphi Lamp Shade Co., 343 Fifth Ave., New York. (Silk)
Admiration Lamp Shade Co., 160 Madison Ave., New York. N. Y. (Silk.)
Andrews Co., C. M., 32 E. 30th, New York, N. Y. (Silk.)
Art Lamp Shade Studios, 316 Fifth Ave., New York, N. Y.
Audrey Art Shade Studios, 105 Thatford Ave., Brooklyn.
Borghese. See Hall, Chas.
Clark, H. W., 813 Fourth Ave. N., Troy, N. Y. (Parchment.)
Daiger Co., Charles V., 78 Essex, Boston Mass. (Silk.)
Eastern Art Shop, 11 E. 26th, New York. (Parchment.)
Foss, Leonard R., 1338 E. 12th, Oakland, Cal. (Parchment.)
Foslite. See Foss, Leonard R.
Frostelene. See Art Lamp Shade Studios.
Gibson Art Co., 223 W. Fourth, Cincinnati, Ohio. (Paper.)
Hall, Chas., 3 E. 40th, New York, N. Y. (Paper Parchment.)
Hanson Co., Paul, 15 E. 26th, New York, N. Y. (Chintz.)
Harris Mfg. Co., 122 University Place, New York, N. Y. (Parchment.)
Herco Art Mfg. Co., Meriden, Conn.
Idealite Lamp Shade Mfg. Co., 4955 Fremont, Jersey City, N. J. (Parchment.)
Kapa Shell. See Wardwell, E. H.
Kerwin. See Hall, Chas.
Kno-Glaire. See Hamilton, M. E.
Lamb Bros. & Greene Corp., Napannee, Ind. (Silk.)
Luxrite. See John H. St. John.
Monarch Lamp & Shade Co., 210 N. Second, Philadelphia, Pa. (Silk.)
Morimura Bros., 58 W. 23rd, New York. (Bamboo. Silk Cretonne.)
Parchment Novelty Co., 87 E. 10th, New York, N. Y. (Parchment.)
Patent Lamp Shade Co., 1361 Frankford Ave., Philadelphia
Peerless Lamp Shade Mfg. Co., 114 E. 25th, N. Y. (Silk
R. D. Electric Co., 2425 Spy Run, Fort Wayne, Ind. (Linen and Silk.)
Reuter, Wm., 32 W. 34th, New York, N. Y. (Silk.)
Rosita Studio, 10 W. 28th, New York, N. Y. (Parchment and Leatherette.)
Sanderson's Art Co., Milwaukee, Wis. (Parchment.)
Springel & Son, A., 26 S. 3rd, Philadelphia, Pa.

St. John, John H., 1298 Atlantic Ave., Brooklyn, N. Y. (Silk.)
Superior Lamp Shade Manufacturers, 72 Madison Ave., New York, N. Y. (Silk.)
Tombs Studios, Wm. H., 172 Pennsylvania Ave., Newark, N. J. (Parchment Paper.)
Trio Mfg. Co., 610 N. American, Philadelphia, Pa. (Silk.)
Utility Shade Co., Tenafly, N. J.
Vogue Lamp & Shade Co., 130 W. 17th, New York, N. Y. (Parchment.)
Wardwell, E. H., 11 E. 36th, New York, N. Y.

SHADES AND DOMES
Leaded, Mosaic or Figured, Stamped or Cast Metal.
Badenes Mfg. Co., 62 Greene, New York, N. Y.
Bayley & Sons, 105 Vanderveer, Brooklyn, N. Y.
Western Art Glass Shade Works, 101 Turk, San Francisco.
SHADES, FACTORY WINDOW. See Window Shades, Factory.

SHADES, Metallic
Tin, Aluminum, Brass, Copper, Zinc, Steel.
A. A. Elec. Mfg. Co., Bridgeport, Conn. (Sole selling agents, Harry Pickhardt, 17 W. 60th, New York, N. Y.)
Faries Mfg. Co., Decatur, Ill. (Brass, Aluminum, Tin Copper.)
Frink Co., Inc., 389 Lexington Ave., New York, N. Y. (Aluminum, Brass, Zinc, Iron, Steel.)
Hubbell, Inc., Harvey, Bridgeport, Conn. (Aluminum, Brass, Steel, Tin.)
Miller Co., Meriden, Conn.
Monk, H. E., 13 Warren, New York, N. Y. (Tin, Aluminum, Brass, Copper, Zinc & Steel).
Oamco. See Overbaugh & Ayres Mfg. Co.
Overbaugh & Ayres Mfg. Co., 411 S. Clinton, Chicago, Ill.
Richardson Reflector Co., 16 Hudson, New York, N. Y.
Western Reflector Co., 1221 W. Madison, Chicago. (Tin.)

SHADES, Mica
Hirsch Mica Co., 1087 Flushing Ave., Brooklyn, N. Y.
Huse-Liberty Mica Co., 73 Long Wharf, Boston, Mass.
Kant-Krack. See Huse Liberty Mica Co.
Mica Insulator Co., 200 Varick, New York, N. Y.
Storrs Mica Co., 41 Union Sq., New York, N. Y.
Tar Heel Mica Co., Plumtree, N. C.
Tarmilite. See Tar Heel Mica Co.
SHAFT COUPLINGS. See Couplings, Shaft.
SHAFTS, Flexible. See Tubing, Flexible Metallic.
SHEARS, Metal Cutting. See Shears, Power.
SHEARS, Rotary. See Shears, Power.

SHEARS, Insulation
Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.

SHEARS, Power
Niagara Machine & Tool Wks., 637 Northland Ave., Buffalo.
SHEET STEEL CABINETS. See Cabinets, Sheet Steel.

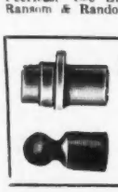
SHELLS, Screw Socket
Chase Brass & Copper Co., Waterbury, Conn.
Dallas Brass & Copper Co., Div. of Revere Copper & Brass Inc., 820 Orleans, Chicago, Ill.
Monowatt Electric Corp., 24 W. 40th, New York, N. Y.
Patton-MacGuyer Co., Providence, R. I.
Risdon Mfg. Co., Naugatuck, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Torrington Mfg. Co., Torrington, Conn.
Waterbury Brass Goods Corp., Waterbury, Conn.
SHUNTS, Instruments. See Instruments, Laboratory Standard.
SIGN FLASHERS. See Flashers, Sign.
SIGN LETTER LENSES. See Lenses.

SILICA
Ottawa Silica Co., Ottawa, Ill. "Flint Shot."
SILK, Cloth Insulated. See Cloth & Paper.
Shades. See Shades, Fabric.
Tape. See Tape.
Thread. See Yarn, etc.

SILVER, Metal and Wire
Baker & Co., Inc., 54 Austin, Newark, N. J.
Elsler Electric Corp., 770 S. 13th St., Newark, N. J.
General Plate Co., Attleboro, Mass.
Gilby Wire Co., Riverside Ave., Newark, N. J.
Handy & Harman, 57 William, New York, N. Y.
National-Harris Wire Co., Newark, N. J.
Wilco. See Wilson Co., H. A.
Wilson Co., H. A., Newark, N. J.
SILVER SOLDER. See Solder, Silver.
SINE WAVE OSCILLATORS. See Instruments, Laboratory Standard.
SIGN ELECTRODES, Gas. See Electrodes for Gas Signs.
SKINNERS WIRE. See Scrapers.
SLABS, Switchboard. See Asbestos Slabs; also Molded Insulation, Slate; Soapstone.

SLATE
For Switchboard Slabs and Barriers.
Davis Slate & Mfg. Co., 618 E. 40th, Chicago, Ill.
Electrical Specialties Corp., 50 Pearl, Boston, Mass.
Fair Haven Marble & Marbleized Slate Co., Fair Haven, Vt
Penrhyn Slate Co., Hydeville, Vt.
Portland-Monsen Slate Co., Portland, Me.
Structural Slate Co., Pen Argyl, Pa.
SLEEVE-BEARINGS. See Bearings and Bushings.
SLEEVING, Cotton. See Tape, Cotton.
SLOTTING FILES. See Files, Commutator Slotting.

SLOTTING MACHINES and TOOLS, Commutator
(Mica Undercutters).
Allen Electric & Equipment Co., Kalamazoo, Michigan
Binghamton Flexible Shaft Co., Binghamton, N. Y.
Burton-Rogers Co., 857 Boylston, Boston, Mass.
Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.
General Electric Co., Schenectady, N. Y.
Hobart Bros. Co., Troy, Ohio.
Hullhorst Micro Tool Co., 3242G Monroe, Toledo, O.
Ideal Commutator Dresser Co., 1008 Park Ave., Sycamore, Ill.
Imperial. See Martindale Elec. Co.
Martindale Electric Co., 1262 W. Fourth, Cleveland, Ohio
Oman, David W., 43 Royalstone Ave., Minneapolis, Minn
Peerless. See Electric Service Supplies Co.
Ransom & Randolph Co., Superior & Chestnut, Toledo, Ohio


SCREW MACHINE PRODUCTS
in Brass or Steel
Send us your specifications for an estimate.
LINDEN & COMPANY
891 Broad St.,
Providence, R. I.

It is sometimes necessary to bend the tang of a soldering lug or maybe the cable is suspended in such a way that constant swaying or movement will bend the lug . . . .

Here's a Soldering Lug that Could Not Stand Bending

. . . it isn't an ILSCO lug or it wouldn't have broken as this unretouched photo shows.

Every ILSCO Soldering Lug is annealed to allow for possible bending.

This annealing process costs the buyer of ILSCO Lugs nothing—it is merely another ILSCO precaution that insures quality and lasting satisfaction in the use of our products.

ILSCO COPPER TUBE & PRODUCTS, INC.
5629 Madison Rd.
CINCINNATI

MULLINS
FOR STAMPINGS

Quality, Service and Price

Automotive and General Stampings—Washing Machine Tubs—Bases—Legs—Gear Housings—Belt Guards—Lids—Gasoline Pump Parts, etc.

Mullins Manufacturing Corp.
Main Office and Works: Salem, Ohio
In Cleveland and Pittsburgh District
BRANCH OFFICE 332 So. Michigan Ave., Chicago
" " 7-252 General Motors Bldg., Detroit

WIRE STRIPPING MACHINE
Strips Parallel and Heater Cord In One Operation!

A new production machine for stripping parallel cord, heater cord, reinforced cord, Tirex cord or one to three single wires IN ONE OPERATION.

Used by many of the largest electrical manufacturers in the country.

New shears specially designed for cutting insulated wire. New features. Double movement cutting blades easily sharpened and replaced. Operated by foot pedal.

Write for illustrated bulletins.

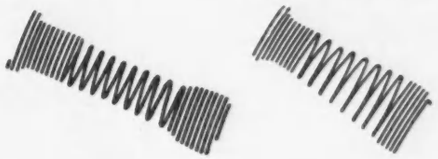
Price $38.00 net

F.O.B. New York

Sent on 15 Days FREE Trial

HENRY CARLANDER
Manufacturer
508 West 146th Street New York, N. Y.

Coiled Springs



Flat Springs

Small Stampings

in any quantity

of any material

for the
Electrical Manufacturer

May we figure on your needs?

THE WALLACE BARNES CO.
BRISTOL, CONNECTICUT

Barnes **made**
COLD ROLLED SPRING STEL SPRING WASHERS ASSEMBLIES SCREW MACHINE PARTS SMALL STAMPINGS
SPRINGS

SLOTTING MACHINES AND TOOLS, COMMUTATOR—Continued.
Simplex. See Weidenhoff, Joseph.
South Bend Lathe Works, 425 E. Madison, South Bend, Ind
Weidenhoff, Joseph, 4352 Roosevelt Rd., Chicago, Ill
White Dental Mfg. Co. (Industrial Div.), S. S., 153 W. 42nd, New York, N. Y.

SNAP SWITCHES. See Switches, Snap

SOAPSTONE

For Switchboard Slabs and Barriers.
Alberene Stone Co., 153 W. 23rd, New York, N. Y.
Kirchberger & Co., Inc., 1425 37th, Brooklyn, N. J.
Lin-Stun. See Westinghouse.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

SOCKET LININGS. See Linings, Socket
SOCKET SHELLS. See Shells, Screw Socket.
SOCKETS, Flashing. See Flashers, Sign.

SOCKET Chain Attachments

Chain Links, Chain Adjusters, Acorns, Extensions, Insulated Chain Splicers.
Abbott. See Harvey Hubbell, Inc.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Benjamin Elec. Mfg. Co., Des Plaines, Ill.
Bryant Electric Co., Bridgeport, Conn.
Duplex. See Warner Bros. Co.
Easylite. See Rittenhouse Co., A. E.
Economy. See Harvey Hubbell, Inc.
Flory, Wm. E., 38 W. 32nd, New York, N. Y. (Decorative Pull Chains.)
Gripper. See Wittenberg Bros.
Hart & Hegeman, Div. of Arrow-Hart & Hegeman Elec. Co., Hartford, Conn. (Metal Pull Tassel.)
Hubbell, Inc., Harvey, Bridgeport, Conn. (Links and Acorns. Metal Pull Tassels.)
Paiste. See Hart & Hegeman Mfg. Co.
Pass & Seymour, Inc., Div. H, Solvay Sta., Syracuse, N. Y. (Pull Chain, Tassel.)
P. & S. See Pass & Seymour, Inc.
Rittenhouse Co., A. E., Honeoye Falls, N. Y. (Sole Selling Agent, Hatheway & Co., 16 Hudson, New York, N. Y.)
Rodale Mfg. Co., Emaus, Pa.
Royal. See Sears, Henry D.
Scovil Mfg. Co., Waterbury, Conn. (Acorn.)
Sears, Henry D., 50 Boylston, Boston, Mass.
Waterbury Brass Goods Co., Waterbury, Conn. (Acorns.)
Weber. See Sears, Henry D.
Wittenberg Bros., 60 Shipman, Newark, N. J. Links, Insu-

SOCKET REDUCERS AND EXTENSIONS

Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Benjamin Elec. Mfg. Co., Des Plaines, Ill.
Cpn-del-lite. See Sears, Henry D.
Eagle Electric Mfg. Co., 79 Hall, Brooklyn, N. Y.
Electric Co., 94 Allyn, Hartford, Conn.
General Electric Co., Section W-329, Bridgeport, Conn.
Morse Co., Frank W., 241 Congress, Boston, Mass.
Pass & Seymour, Inc., Div. H, Solvay Sta., Syracuse, N. Y.
Propp Co., M., 524 Broadway, New York, N. Y.
Rodale Mfg. Co., Emaus, Pa.
Sears, Henry D., 50 Boylston, Boston, Mass.

SOCKETS, Radio. See Radio Receiver Parts.

SOCKETS AND RECEPTACLES, Lamp

Bases other than Standard (or Medium) are indicated as follows: Mogul, M; Candelabra (or Miniature), C.

Key	See K
Composition	See W
Metal Shell	See B
Porcelain	See A
Pull Chain	See P
Push Through	See T
Sign Receptacles	See A

Acme Elec. & Mfg. Co., Canal & Hamilton Ave., Trenton, N. J. . . . . A
Ajax Elec. Specialty Co., 1926 Chestnut, St. Louis, Mo. . . . . W . . . . . .
Alabax. See Arrow Elec. Co.
Alcor Mfg. Co., 4605 W. Madison, Chicago, Ill. . . . . C . . . . . .
Appleton Electric Co., 1703 Wellington
Appleton Electric Co., 1730 Wellington Ave., Chicago, Ill. . . . . A
Armstrong & White, 9th and Liberty Ave. Pittsburgh, Pa. . . . . A
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn. . . . . M C K T P B A
Arrogrip. See Arrow Elec. Co.
Bearer Mfg. Co., 625 N. Third, Newark, N. J. . . . . C . . . . P B . .
Best. See United States Elec. Mfg. Corp.
Bryant Elec. Co., Bridgeport. . . . M C K T P B A
C-H. See Cutler-Hammer Mfg. Co.
Circle F Mfg. Co., Trenton, N. J. . . . M . . K T P B A
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn. . . . . .
Connecticut Elec. Mfg. Co., Bridgeport, Conn. . . . . M . . K T . . B A
Crouse-Hinds Co., Syracuse, N. Y. . . . A W . . . . . .
Cutler - Hammer, Inc., 1288 St. Paul Ave., Milwaukee, Wis. . . . . K T . . B A
Durez. See Wheeler Reflector Co.
Eagle Elec. Mfg. Co., 79 Hall, Brooklyn
Far-Go Elec. Mfg. Co., 363 Broome, New York, N. Y. . . . . C . . . . . .
Federal Electric Co., 8700 S. State, Chicago, Ill. . . . . A
Flute. See Pass & Seymour.
Flutelier. See Pass & Seymour.
Frink Co., Inc., 389 Lexington Ave., New York, N. Y. . . . . M C . . . . . B . .
Gaynor Elec. Co., Section W-329, Stratford, Conn. . . . . A
General Elec. Co., Section W-329, Bridgeport, Conn. . . . . M C K T P B A
Harter. See Multi Elec'l. Mfg. Co.
Hoosick Falls Radio & Elec'l Parts Mfg. Co., Hoosick Falls, N. Y. . . . . W . . . . . .
Horan Co., E. S., 550 Monroe, Carlstadt, N. J. . . . . A
Hubbell, Inc., Harvey, Bridgeport, Conn. M C K T P B A
H. & H. See Hart & Hegeman.
I-D-A. See Watson Mfg. Co., J. E.

Electrical SLATE

Large Stocks — Quick Deliveries. Send your Slate orders to us.

DAVIS SLATE & MFG. CO.
618 East 40th St., Chicago, Ill.

PORTLAND-MONSON SLATE CO.

PORTLAND-MONSON SLATE CO. TRADE MARK PORTLAND, ME.

Quarriers of
Monson Slate
for Electrical
Purposes, Natural Black, Oil Finish
Quarries:
Monson, Maine
Office, Portland, Maine

K-E Cleat Receptacle. See Kirkman.
Leader. See Leviton Mfg. Co.
Leiser & Co., W. A., 1607 Sansom, Philadelphia, Pa. . . . . A
Leviton Mfg. Co., 236 Greenpoint Ave., Brooklyn, N. Y. . . . . M C K . . P B A
Levolier. See McGill Mfg. Co.
Liberty Bell. See Arrow-Hart & Hegeman Elec. Co.
Locat-A-Catch. See Connecticut.
McGill Mfg. Co., Valparaiso, Ind. . . . . P B A
Multi Elec'l Mfg. Co., 1840 W. 14th, Chicago, Ill. . . . . A
Multilok. See Circle F Mfg. Co.
National Bearing Metal Corp., Div. More-Jones Brass & Metal Co., 4930 Manchester Ave., St. Louis, Mo.
Newgard. See Multi Elec'l Mfg. Co.
New Wrinkle. See Bryant Elec.
Neark. See Colt's Patent Fire Arms.
P. & S. See Pass & Seymour.
Pass & Seymour, Div. H, Solvay Sta., Syracuse, N. Y. . . . . M C K T P B A
Paulding, John I., New Bedford, Mass. . . . . B A
Perkins. See Bryant Elec. Co.
Porcelain Products, Inc., Findlay, O. . . . . A
Quick Catch. See Hubbell, Inc.
Royal. See Sears, Henry D.
Ryan Appliance Co., 117 Mulberry, Trenton, N. J. . . . . W . . . . . A
Sears, Henry D., 50 Boylston, Boston M C K T P B A
Security. See Circle F Mfg. Co.
Shurlock. See Pass & Seymour.
Siemen Co., Bridgeport, Conn. . . . . .
Taplet Mfg. Co., 3709 Powelton Ave., Philadelphia, Pa. . . . . A
Titan. See Bryant Elec. Co.
Union Insul. Co., Parkersburg, W. Va. . . . . .
United States Elec. Mfg. Corp., 222 W. 14th, New York, N. Y. . . . . P . . B . . W
U. S. Electric Co., 18 Chambers, Trenton, N. J. . . . . A
Walco. See Leiser & Co., W. A.
Weber. See Sears, Henry D.
Wheeler Reflector Co., 275 Congress St., Boston, Mass. . . . . P . . . .
Wood Electric Co., C. D., 565 Broadway, New York. (Sign Receptacles.) . . . . . A
Woodwin. See Wood Elec. Co.
Wrinklet. See Bryant Elec. Co.

SOLDER, Aluminum

Federated Metals Co., 233 Broadway, New York, N. Y.
Lasher-Weeber Co., 202 Franklin, Boston, Mass.
Lenk Mfg. Co., 30 Merrimac, Boston, Mass.
Supreme. See Lasher-Weeber Co.
Usarco. See Federated Metals Co.

SOLDER, Bar and Wire

Eagle. See Hoyt Metal Co.
Genuine A. See Hoyt Metal Co.
Hoyt Metal Co., St. Louis, Mo.

SOLDER, Self-Fluxing

Dutch-Boy. See National Lead Co.
Gardiner Metal Co., 1365 W. Lake, Chicago, Ill.
Kester Solder Co., 4210 Wrightwood Ave., Chicago, Ill.
Lenk Mfg. Co., 32 Merrimac, Boston, Mass.
National Lead Co., 111 Broadway, New York, N. Y.
Philadelphia Solder Co., 16th & Indiana Ave., Philadelphia, Pa.
Silva-Wares, Inc., 134 W. 26th St., New York, N. Y.
Solderall Co., 129 Sussex Ave., Newark, N. J.

SOLDER, Silver

General Plate Co., Attleboro, Mass.
Handy & Harman, 57 William, New York, N. Y.
Wilson Co., H. A., Newark, N. J.

SOLDERING

Compounds. See Soldering Compounds.
Irons. See Soldering Irons.
Machines. See Soldering Machines, Commutator
Pots. See Melting Pots & Ladles.
Tools. See Torches and Furnaces.

SOLDERING COMPOUNDS

Stick Paste, Flux Salts, Fluid.
Allen Co., Inc., L. B., 6752 Bryn Mawr Ave., Chicago, Ill. (Stick Paste, Salts, Aluminum Flux, Fountain Brushes.)
Amco. See American Solder & Flux Co.
American Solder & Flux Co., 2910 N. 16th, Philadelphia, Pa.
Armstrong Ke-Ti Products Co., 491 N. Front, Columbus, O.

LARGE SAMPLES FREE
Assures 100% results—
ALLEN FLUX
STICK AND PASTE
Made by world's largest and oldest manufacturers of fluxes. Takes quick bite and doesn't streak. Comes, also, in liquid, salt and oil forms.

L. B. ALLEN CO., INC.
5752 Bryn Mawr Ave., Chicago, Ill.

Benson Co., Alex R., Hudson, N. Y. (Salts and Paste.)
Burnley Battery & Mfg. Co., North East, Pa. (Paste and Stick.)
Brutner Chemical Wks., 217 E. 3rd, Cincinnati, O.
Callahan & Co., Geo., 218 Front, New York. (Fluid.)
Central Stamping Co., 306 Broadway, New York, N. Y. Paste and Salts.
Challenge. See Highland Electro Chemical Co.
Chase Brass & Copper Co., 236 Grand, Waterbury, Conn.
Conductalute. See Technical Products Co.
Crescent. See McGill Mfg. Co.
Dielectric Mfg. Co., St. Louis, Mo.
Dunton Co., M. W., Providence, R. I.
Dutch-Brand. See Van Cleef Bros.
Eureka. See Grasselli Chemical Co.
Firth Radio Corp., 25 Beaver, New York, N. Y.
Fluxite. See Monarch Products Co.
General Elec. Co., Section W-329 Bridgeport, Conn. (Paste.)
Grasselli Chemical Co., Guardian Bldg., Cleveland, O.
Highland Electro Chemical Mfg. Co., Connellsville, Pa (Paste, Stick, Salts.)
Incomparable. See Reade Mfg. Co.
Kester Solder Co., 4210 Wrightwood Ave., Chicago, Ill.
Leveridge, Inc., Chas. W., 346 Fulton, New York, N. Y
Lotan Research Corp., 6545 Euclid Ave., Cleveland, O.
Luco. See Lukens Metal Co.
Lukens Metal Co., T. F., 1105 Fairmount Ave., Philadelphia, Pa.
McGill Mfg. Co., Valparaiso, Ind. Fluid.
Mitchell-Rand Mfg. Co., 19 Vesey, New York. (Paste.)
Neutral. See Dielectric Mfg. Co.
New-Idea. See Hartwig Co., Wm. J.
Nokorode. See Dunton Co., M. W.
Oakwood. See Weaver Specialty Co.
Paragon Insulating Co., 5716 Euclid Ave., Cleveland, O.
Perfecto. See Firth Radio Corp.
Pfanstiehl Chemical Co., Waukegan, Ill. Paste, Salts Sticks, Fluid, Oil, and Solid Sal Ammoniac.
Queens. See Brunner Chemical Works.
Reade Mfg. Co., 133 Hoboken Ave., Jersey City, N. J (Fluids, Salts, Paste).
Redine. See Reade Mfg. Co.
Red-Letter. See Ruby Chemical Co.
Rotax Mfg. Co., Bathgate Place, Newark, N. J.
Ruby Chemical Co., Columbus, O.
Ruby Fluid. See Ruby Chemical Co.
Salbrick. See American Solder & Flux Co.
Snarr & Co., Geo. W., 110 S. Ninth, St. Louis, Mo. (Paste.)
Snowflake. See Grasselli Chemical Co.
Snowflake. See Highland Electro Chemical Co.
Solderine. See Central Stamping Co.
Solderite, Inc., 22 Green, Newark, N. J.
Speco. See Pfanstiehl Chemical Co.
Standard. See Grasselli Chemical Co.
Star. See McGill Mfg. Co.
Superior. See Highland Electro Chemical Co.
Technical Products Co. (Sharpsburg Station), Pittsburgh, Pa. (Paste.)
Tinol. See American Solder & Flux Co.
Van Cleef Bros., 7722 Woodlawn Ave., Chicago, Ill.
Weaver Specialty Co., 6344 Aurelia, Pittsburgh, Pa.
Yager's. See Benson Co., Alex. R.
Yankee. See Leveridge, Inc., Chas. W.

SOLDERING IRONS

Acme Elec. Heating Co., Dept. R, 1217 Washington, Boston
Adroit. See Adrola Corp.
Adrola Corp., Port Jefferson, N. Y.
American Beauty. See American Elec'l. Heater Co.
American Elec'l. Heater Co., Woodward & Burroughs Ave., Detroit, Mich.
Beardsley & Wolcott Mfg. Co., Waterbury, Conn.
Beckwith Machine Co., 402 Chestnut, Ravenna, Ohio.
Betsy Ross. See Central Flatiron Mfg. Co.
Brach Mfg. Corp., L. S., Newark, N. J.
Burnley Battery & Mfg. Co., North East, Pa.
Central Flatiron Mfg. Co., Johnson City, N. Y.
Chapman Machine Co., Terryville, Conn.
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee.
Davis Specialty Works, East Gary, Ind.
Dominion Elec'l Mfg. Co., 712 Ontario Ave., W., Minneapolis.
Dover Mfg. Co., Dover, O.
Drake Elec. Wks., 3943 Lincoln Ave., Chicago, Ill.
Edison General Electric Appliance Co., Inc., 5600 W. Taylor, Chicago, Ill.
Electrahot Mfg. Co., 525 S. 4th, Minneapolis, Minn.
Electric Heat Control Co., 5902 Carnegie Ave., Cleveland (Transformer Soldering Outfit.)
Electric Soldering Iron Co., Inc., 135 W. 17th, New York
Enco. See Electrical Necessities Corp.
Exico. See Electric Soldering Iron Co.
Everhot. See Swartzbaugh Mfg. Co.
Ever-Ready. See Gold Seal Elec. Co.
General Electric Co., Schenectady, N. Y.
Gold Seal Elec'l. Co. of Ohio, Inc., 250 Park Ave., New York, N. Y.
Industrial. See Permway Mfg. Co.
Jiffy. See Koch & Co., Paul W.
King. See Electric Heat Control Co.
Koch Co., Paul W., 19 S. Wells, Chicago. (Solder Dipper.)
Landers, Frary & Clark, New Britain, Conn.
Lenk Mfg. Co., 30 Merrimac, Boston, Mass.
Lotan. See Simplex Flux & Solder Co. of America.
Lucifer. See Jones Point Tool & Elec. Co.
Majestic Electric Appliance Co., San Francisco, Cal.
Manning-Bowman & Co., Meriden, Conn.
Moto-Ray Mfg. Co., 169 Massachusetts Ave., Boston, Mass
National Specialties Co., Howell & Tyler Sts., Fort Wayne, Ind.
Northern Elec. Co., 2833 N. Western Ave., Chicago, Ill
Queen Quality. See Watlow Elec. Mfg. Co.
Quick-Hot. See Moto-Ray Mfg. Co.
Regular. See National Specialties Co.
Reliance. See Landers, Frary & Clark.
Samson-United Corp., Probert, Rochester, N. Y.
Simplex Div. of Edison General Elec. Appliance Co., Inc., 5600 W. Taylor, Chicago, Ill.
Simplex Flux & Solder Co. of America, 1965 E. 66th, Cleveland, O.
Sta-Warm. See Beckwith Machine Co.
Superior Elec. Products Corp., 1300 S. 13th, St. Louis, Mo
Swartzbaugh Mfg. Co., 1501 W. Bancroft, Toledo, O.
Torrid. See Beardsley & Wolcott Mfg. Co.
Trent, Harold E., 439 N. Twelfth, Philadelphia, Pa.
Varick Elec. Mfg. Co., 28 E. 21st St., New York, N. Y
Vulcan Elec. Heating Co., 225 Varick, New York, N. Y

For those who want the best
SOLDERING FLUID
Non-poisonous, non-corrosive, economical, quick acting. Shipped in tin. A liberal sample free.

The Ruby Chemical Company
Columbus, Ohio

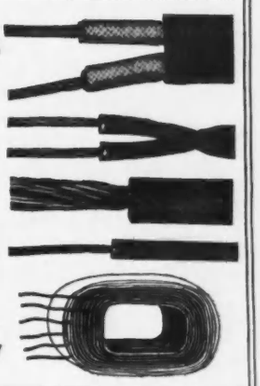
OUR

Insulated Wire Strippers —A Big Help At Low Cost—

Guaranteed by Trial

We specialize on equipment for removing insulation from any wire or coil lead as required for any electrical connection.

One of our motor driven tools will save you time, money and trouble, and improve quality of work. Let us suggest the best equipment for your job. Descriptive bulletin and low prices mailed on request.



The Wire Stripper Company

565 Erie Bldg., Cleveland, Ohio

Standard Thermostatic Metal *Non-Rusting Thermostatic Metal*

A NEW combination of metals perfected to avoid the necessity of extra processing when contact with steam or water makes the use of other thermostatic metals impractical. Little loss of sensitivity. Made in all sizes and shapes for every application.

Contact Points

in Platinum, Silver and Alloys

Interstate Products Corporation

503 Mulberry Street, Newark, N. J.

Uniform Stamping on Name Plates

THIS MACHINE DOES IT.

Dial Carries Letters & Figures

Fast and Neat Marking by Inexperienced Help

Write for Catalog of Our Marking Tools

Geo. T. Schmidt, Inc., 4102 Ravenswood Ave., Chicago, Ill.

GITS BROS.

Better Oilers

287 *Styles & Sizes*

GITS BROS MFG. CO.
1940 S. Kilbourn Chicago.

SHERMAN SOLDERING LUGS

Patented

—a Complete Standardized Line That Provides for Every Existing Need

Manufacturers of panel board equipment can answer any soldering lug problem with the SHERMAN *standardized* line.

No matter what its size or type may be, every SHERMAN Soldering Lug is accurately made to exactly fit a specific need.

Perfect service is assured either for standard Lugs or for special dimensions to exactly suit the problem in hand.

Write for samples for testing—mention the size you are most interested in.

SHERMAN TERMINALS

also in a *standardized* and complete line —

Because we are the largest makers of terminals in the world, our line of brass and copper wire and cable terminals covers every need with the greatest electrical efficiency at the least cost.

In Bulletin 13 you will find detailed information—samples for inspection and testing will also be sent on request.

H. B. SHERMAN MFG. CO.
Battle Creek, Mich.

SOLDERING IRONS—Continued
Wagge Elec. Co., 5100 W. Ravenswood Ave., Chicago, Ill.
Ward Mfg. Co., 1116 Milton Ave., Chicago, Ill.
Watlow Elec. Mfg. Co., 1320 N. 23rd, St. Louis, Mo.
Wellmade Elec. Mfg. Co., Torrington, Conn.

SOLDERING MACHINES, Commutator

(For production soldering of small commutators).
Allatonos. See Chapman Electric Works, P. E.
Chapman Electric Works, P. E., 1820 Chouteau Ave., St. Louis, Mo.
SOLENOIDS. See Coils
SOLVENTS & REDUCERS, VARNISH. See Paint, Varnish, Lacquer.
SPAGHETTI. See Tubing, Varnished Fabric.
SPEED CHANGING UNITS. See Gears (Speed Changing Units).
SPEED INDICATORS. See Tachometers.
SPEED REDUCERS. See Gears, Speed Changing Units
SPOOLING MACHINES, WIRE. See Wire Manufacturing Machines.

SPRAYING OUTFITS

Airmode. See Reliable Mfg. Co.
Airway. See Binks Spray Equip. Co.
Atomister Corp., 21 Hamilton, Rahway, N. J.
Beach Air Brush Co., Willard C., Second & Warren, Harrison, N. J.
Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill.
Breuer Electric Mfg. Co., 852 Blackhawk, Chicago, Ill.
De Vilbiss Co., 3750 Detroit Ave., Toledo, Ohio.
Eclipse Air Brush Co., 79 Orange, Newark, N. J.
Elsler Electric Corp., 770 S. 13th St., Newark, N. J.
Electric Sprayit Co., 830 E. Colfax Ave., South Bend, Ind
Eureka Sprayers, Inc., 87-28 150th, Richmond Hill, N. Y
Gast Mfg. Corp., Bridgman, Mich.
Globe Mfg. Co., Battle Creek, Mich.
Hobart Mfg. Co., Simpson & Penn Sts., Troy, Ohio.
Hurley. See Binks Mfg. Co.
Ideal Air Brush Mfg. Co., 270 Lafayette, New York, N. Y.
Kellogg Mfg. Co., 97 Humboldt, Rochester, N. Y.
Koch Bros. Mfg. Co., 3239 Nelson, Chicago, Ill.
K B. See Koch Bros. Mfg. Co.
Metal Specialties Mfg. Co., 338 N. Kedzie Ave., Chicago.
Macleod Co., 2232 Bogen, Cincinnati, O.
Matthews Corp., W. N., 3722 Forest Park Blvd., St. Louis, Mo.
Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill.
Paint-O-Mister. See Atomister Corp.
Pioneer Air Compressor Co., 243 Canal, New York, N. Y.
Presto. See Metal Specialties Mfg. Co.
Reliable Mfg. Co., Dwightway & Fourth St., Berkeley, Cal.
Sharpe Mfg. Co., 1356 S. Flower, Los Angeles, Cal.
Simons Paint Spray Brush Co., 17 Maryland Ave., Dayton, O.
Simplex Spray Equipment Co., 552 W. Lake, Chicago, Ill.
Spraco, Inc., Somerville, Mass.
Spray-All. See United States Air Compressor Co.
Sprayit. See Electric Sprayit Co.
United States Air Compressor Co., 5300 Howard Ave., Cleveland, O.
Weld Air Brush Mfg. Co., 2173 N. California Ave. Chicago, Ill.
SPREADERS, COIL & LOOP. See Winding Machines Armature & Field Coil.

SPRING MAKING MACHINES

Sleeper & Hartley, Inc., Worcester, Mass.

SPRINGS

Advance Spring Corp., Carroll Ave. & Wood Ave., Chicago, Ill.
American Coil Spring Co., Muskegon, Mich.
American Spiral Spring & Mfg. Co., Arsenal Sts., Pittsburgh, Pa.
American Spring & Mfg. Co., Holly, Mich.
Barnes Co., Wallace, Bristol, Conn.
Barnes-Gibson-Raymond, Inc., 6400 Miller Ave., Detroit.
Cary Spring Works, Inc., 240 W. 20th St., New York, N. Y
Cleveland Wire Spring Co., Cleveland, O.
Cook Spring Co., Ann Arbor, Mich.
Cuyahoga Spring Co., Beres Rd., Cleveland, O.
Dunbar Bros. Co., Bristol, Conn.
Eureka Tinware Mfg. Co., 135 W. 20th, New York, N. Y
Fischer Spring Co., Chas., 238 Kent Ave., Brooklyn, N. Y.
Flexo Spring Mfg., Inc., 34 South First, Brooklyn, N. Y.
Gibson Co., Wm. D., 1800 Clybourn Ave., Chicago, Ill.
Hubbard Spring Co., M. D., Pontiac, Mich.
Humason Mfg. Co., Forestville, Conn.
Hunter Pressed Steel Co., Lansdale, Pa.
Kokomo Spring Co., Kokomo, Ind.
Lee Spring Co., 34 Main, Brooklyn, N. Y.
Mattatuck Mfg. Co., Waterbury, Conn.
Miller & Van Winkle, Inc., 18 Bridge, Brooklyn, N. Y.
Newcomb Spring Corp., 234 40th, Brooklyn, N. Y.
Peck Spring Co., Plainville, Conn.
Peterson Spring Co., 1660 Beard Ave., Detroit, Mich.
Rapid Spring Co., 223 Second Ave., Pittsburgh, Pa.
Raymond Mfg. Co., Corry, Pa.
Standard Spring and Manufacturing Co., 236-42nd St. Brooklyn, N. Y.
Steinen & Co., 297 Washington, Newark, N. J.
Yost Superior Co., Springfield, O.
Young Industries, Inc., L. A., Detroit, Mich.
STAMPED BOXES. See Cabinets, Sheet Steel.
STAMPINGS, Fibre. See Fibre.
Sheet Metal. See Fixture Fittings.
Sheet Steel. See Stampings, Sheet Steel.
Small. See Stampings, Small.

STAMPINGS, Sheet Steel

Heavy Stamping and Drawing.
Acklin Stamping Co., 1925 Nebraska, Toledo, O.
American Stamping Co., 978 E. 64th Cleveland, O.
Bartlett-Thompson Co., 67 Sudbury, Boston, Mass.
Benjamin Elec. Mfg. Co., Des Plaines, Ill.
Berger Mfg. Co., Canton, O.
Besseri Corp., 1002 Oswego St., Utica, N. Y.
Challenge Stamping & Porcelain Co., Grand Haven, Mich.
Crosby Co., Buffalo, N. Y.
Detroit Metal Specialty Co., 1651 Beard, Detroit, Mich.
Eureka Tinware Mfg. Co., 135 W. 20th, New York, N. Y
Furies Mfg. Co., Decatur, Ill
Fischer Spring Co., Chas., 238 Kent Ave., Brooklyn, N. Y
Geuder, Paeschke & Frey, 1392 St. Paul Ave., Milwaukee.
Hubbard & Co., 6301 Butler, Pittsburgh, Pa.
Hunter Pressed Steel Co., Lansdale, Pa.
Janney, Jr., Joseph A., 1421 Chestnut St., Philadelphia

Lansing Stamping Co., Lansing, Mich.
Massachusetts Machine Shop, Inc., Boston, Mass.
Mathews Mfg. Co., 104 Gold, Worcester, Mass.
Metal Specialty Co., 1553 Riverside Drive, Cincinnati, O.
Metropolitan Devices Corp., 1250 Atlantic Ave., Brooklyn.
Mignon Elec. Corp., 909 Genesee, Buffalo, N. Y.
Mullins Mfg. Corp., Salem, Ohio. (Vitreous Enameled.)
New England Pressed Steel Co., Natick, Mass.
Seymour Products, Seymour, Conn.
Thomas & Skinner Steel Products Co., 1102 E. 23rd, Indianapolis, Ind.
Truscon Steel Co., Youngstown, O.
United States Stamping Co., Moundsville, W. Va.

STAMPINGS, Small

Small Stamped Metal Parts for Electrical Devices.
Aerial Machine & Tool Co., 79 Grand, New York, N. Y.
American Radio Hardware Co., 135 Grand, New York, N. Y.
American Stamping Co., 978 E. 64th, Cleveland, O.
Arrow Automatic Products Corp., 27 Vestry, New York, N. Y.
Barnes Co., Wallace, Bristol, Conn.
Beaver Mfg. Co., 625 N. Third, Newark, N. J.
Bridgeport Brass Co., 774 E. Main, Bridgeport, Conn.
Bull Dog Electric Products Co., Detroit, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
Cinch Mfg. Corp., 2335 W. Van Buren, Chicago, Ill.
Clarke Metal Products, Inc., 490 Hancock Ave., Bridgeport Conn
Colonial Radio Corp., 25 Wilbur Ave., Long Island City, N. Y.
Detroit Metal Specialty Co., 1651 Beard, Detroit, Mich.
Diamant & Tool Mfg. Co., 401 Mulberry, Newark, N. J.
Elco Tool & Screw Corp., 1818 Broadway, Rockford, Ill.
Eureka Tool & Machine Co., 42 Walnut, Newark, N. J.
Furies Mfg. Co., Decatur, Ill.
Fischer Spring Co., Chas., 238 Kent Ave., Brooklyn, N. Y
Froiland Chain & Mfg. Co., Springfield, Mass.
Geuder, Paeschke & Frey, 1392 St. Paul Ave., Milwaukee.
Grammes & Sons, Inc., L. F., Allentown, Pa.
Gray Bros. Co., Plano, Ill.
Great Lakes Pressed Steel Corp., 1410 Niagara, Buffalo, N. Y.
Hubbard Spring Co., M. D., Pontiac, Mich.
Hubbell, Inc., Harvey, Bridgeport, Conn.
Humason Mfg. Co., Forestville, Conn.
Hunter Pressed Steel Co., Lansdale, Pa.
Imperial Electrical Co., Union City, Ind
Kirschner's Mfg. Co., 255 Calyer, Brooklyn, N. Y.
Lenz Metal Stamping Wks., J., 199 Franklin, New York.
Marion Elec. Mfg. Co., 24 Cliff, Jersey City, N. J.
Massachusetts Machine Shop, Inc., Boston, Mass.
Mathews Mfg. Co., 104 Gold, Worcester, Mass.
Mattatuck Mfg. Co., Waterbury, Conn.
McDowell Mfg. Co., Millvale Sta., Pittsburgh, Pa.
Mechanics Tool & Stamping Co., 7 Summer, Worcester, Mass
Melaun Mfg. Co., 144 E. Morris, Indianapolis, Ind.
Mignon Elec. Corp., 909 Genesee, Buffalo, N. Y.
Monowatt Electric Corp., 24 W. 40th, New York, N. Y.
Mutual. See Bull Dog Elec. Products Co.
Patton-MacGuyer Co., Providence, R. I.
Paul & Beekman Mfg. Co., 1734 N. Fifth, Philadelphia, Pa
Plume & Atwood Mfg. Co., 474 Bank, Waterbury, Conn
Precision Metal Workers, 3100 Carroll Ave., Chicago, Ill
Premax Products, Inc., 230 Tenth, Niagara Falls, N. Y.
Quadriga Mfg. Co., 218 W. Grand Ave., Chicago, Ill.
Ribaysen Mfg. Co., J., 4442 Roosevelt Rd., Chicago, Ill.
Riadon Mfg. Co., Naugatuck, Conn.
Roach-Appleton Mfg. Co., 3440 N. Kimball Ave., Chicago.
Russell Mfg. Co., John M., Naugatuck, Conn.
Schollhorn Co., Wm., New Haven, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Sharples Separator Co., Riddle & Patten Ave., Westchester, Pa.
Sherman Mfg. Co., H. B., Battle Creek, Mich.
Signal Elec. Mfg. Co., Menominee, Mich.
Sass Mfg. Co., Roselle, N. J.
Steinen & Co., 297 Washington, Newark, N. J.
Thomas & Skinner Steel Products Co., 1102 E. 23rd, Indianapolis, Ind.
United Screw & Bolt Corp., Cleveland, O.
United States Stamping Co., Moundsville, W. Va
Waterbury Brass Goods Corp., Waterbury, Conn.
Waterbury Button Co. (Elect. Mfg. Div.), Waterbury, Conn.
Western Cartridge Co., East Alton, Ill.
Zierick Machine Wks., F. R., 68 E. 131st St., New York, N. Y.

STANDS, Armature

Columbia Machine Works & Malleable Iron Co., 263 Chestnut, Brooklyn, N. Y.
Electric Service Supplies Co., 17 & Cambria Sts., Philadelphia, Pa.
Oman, David W., 43 Royalstone Ave., Minneapolis, Minn
Peerless. See Electric Service Supplies Co.
Ridion Company, Frank, Boston, Mass.
Weidenhoff, Joseph, 4352 Roosevelt Rd., Chicago, Ill.
STARTERS, Motor. See Controllers, Motor; Switches, Remote Control; Switches, Knife; Safety; Switches, Snap (Heavy Duty).
STEATITE. See Cores, Resistance Coil.
STEEL CASTINGS. See Castings, Steel.

STEEL for Electric Appliances

Elyria Iron & Steel Co., Elyria, O.
Republic Steel Co., 335 Market, Youngstown, O.
Sperzel & Son, Jos., 2558 W. 16th, Chicago, Ill.

STEEL, Magnet

Ajax Electrothermic Corp., Ajax Park, Trenton, N. J.
Hercules Elec. Steel Corp., 145 Lafayette St., New York.
Ludlum Steel Co., Watervliet, N. Y.
Reed Co., Jr., David, 85 Adams, Brooklyn, N. Y.
Swedmag. See Reid Co., Jr., David.

STEEL SHEETS

Agathon. See Republic Iron & Steel Co.
Allegheny Steel Co., Brackenridge, Pa.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh.
Armco. See International Corp., Middletown, O.
Armeloc. See Empire Steel Corp.
Cyclops Steel Co., Titusville, Pa.
Dynelec. See Empire Steel Corp.
Empire Steel Corp., Mansfield, O.
Firth-Sterling Steel Co., McKeesport, Pa
Follansbee Bros. Co., Third & Liberty, Pittsburgh, Pa.
Manelec. See Empire Steel Corp.
Metelec. See Empire Steel Corp.
Newport Rolling Mill Co., Newport, Ky.
Poielec. See Empire Steel Corp.

Republic Iron & Steel Co., 335 Market, Youngstown, O
Tranelec. See Empire Steel Corp.
Unilov. See Universal Steel Co.
Universal Steel Co., Bridgeville, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
STEEL, STRIP. See Strip Steel.

STOCKS, Dies and Reamers

Hall-Will, Inc., Twelfth & Cranberry, Erie, Pa.
Red-E-Hall. See Hall-Will, Inc.
Toledo Pipe Threading Machine Co., 1445 Summit, Toledo, O.

STONES, Commutator

Acme. See Green Equipment Corp.
Caro. See Electric Service Supplies Co.
Cleveland Stone Co., Union Trust Bldg., Cleveland, O.
Co-operative Utilities Co., 1503 Columbia Ave., Philadelphia, Pa.
Diamond Dee. See Co-operative Utilities Co.
Electric Service Supplies Co., 17th and Cambria, Philadelphia, Pa.
Green Equipment Corp., 280 Monadnock Block, Chicago, Ill.
Ideal Commutator Dresser Co., 1008 Park Ave., Sycamore, Ill.
Imperial. See Martindale Electric Co.
Lombard & Co., Somerville, Mass.
Martindale Elec. Co., 1262 W. Fourth, Cleveland, O.

STOOLS, Factory; Steel

Angle Steel Stool Co., Plainwell, Mich.
Chicago Wire Chair Co., 613 N. La Salle, Chicago, Ill.
Royal Metal Mfg. Co., 1140 South Michigan Ave., Chicago.

STORAGE

Battery Plates. See Plates, Storage Battery.
Battery, Separators. See Separators.
Tools. See Tools, Storage Battery.
STRAINING MACHINES, INSULATION. See Wire Manufacturing Machines.

STRAIGHTENERS, Armature Shaft

Columbia Machine Works & Malleable Iron Co., 263 Chestnut, Brooklyn, N. Y.
STRANDING MACHINES. See Wire Manufacturing Machines.

STRIP STEEL

(Hot and Cold Roll).
Acme Steel Co., 2832 Archer Ave., Chicago, Ill. (Hot & Cold).
American Steel & Wire Co., 208 S. La Salle, Chicago, Ill. (Cold).
Athenia Steel Co., 135 William, New York, N. Y. (Cold.)
Barnes Co., Wallace, Bristol, Conn. (Hot.)
Griffin Mfg. Co., Huron & Cherry, Erie, Pa. (Cold.)
Laclede Steel Co., Arcade Bldg., St. Louis, Mo. (Hot.)
Latrobe Electric Steel Co., Latrobe, Pa. (Hot & Cold.)
Republic Iron & Steel Co., 335 Market, Youngstown, O
Sharon Steel Hoop Co., Sharon, Pa. (Hot.)
Stanley Wks., New Britain, Conn. (Hot & Cold.)
Steel and Tubes, Inc., Cleveland, O. (Hot & Cold.)
Superior Steel Corp., 2122 Grant Bldg., Pittsburgh, Pa. (Hot & Cold.)
Thomas Steel Co., Warren, Ohio.
West Leechburg Steel Co., Farmers Bank Bldg., Pittsburgh, Pa. (Hot & Cold.)

STRIPPERS, Wire

Acme. See A. Laubscher.
Artos Engineering Co., 115 Brown, Milwaukee, Wis (Cutting, Stripping and Measuring).
Austin Co., M. B., 108 S. Desplaines, Chicago, Ill.
Carlander, Henry, 508 W. 146th, New York, N. Y.
Colonial-Premier Co., 229 W. Ohio, Chicago, Ill.
Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.
E-Z. See Pyramid Products Co.
F. F. See France Mfg. Co.
France Mfg. Co., 10306 Beres Rd., Cleveland. (Motor Driven.)
Goehst. See Klein & Sons.
Hartman. See Service Sales & Mfg. Co.
Ideal Commutator Dresser Co., 1008 Park Ave., Sycamore, Ill.
Ives Mfg. Co., Meriden, Conn.
Klein & Sons, Mathias, Chicago, Ill.
Laubscher, A., 77 Fort Pleasant Ave., Springfield, Mass.
Perfection. See Weber Machine Corp.
Pyramid Products Co., 2311 S. State, Chicago, Ill.
Service Sales & Mfg. Co., 3405 W. 150th, Cleveland, O.
Speedcraft. See Wire Stripper Co.
Thomas Steel Products Co., Warren, Ohio.
Weber Machine Corp., Rochester, N. Y.
Wire Stripper Co., 565 Erie Bldg., Cleveland, O. (Motor Driven Wire Stripper & Wire Twister.)
Zierick Machine Wks., F. R., 68 E. 131st, New York City. (Motor Driven Stripper & Twister).
SWITCHBOARD INSTRUMENTS. See Instruments, Portable and Switchboard.
SWITCHBOARD OPALS. See Lenses
SWITCHBOARD SLABS AND BARRIERS
See Asbestos Slabs; Molded Insulation; Slate; Soapstone.
SWITCH (Switches).
Arms. See Posts, Binding.
"Across the Line" Type. See Controllers, Motor.
Baby Knife. See Switches, Battery.
Battery. See Switches, Battery.
Canopy. See Switches, Snap.
Clock Operated. See Switches, Time.
Feed Through. See Switches, Snap.
Fixture. See Switches, Snap.
Float. See Switches, Tank.
Flush. See Switches, Snap.
Handles. See Handles, Wood
Knife, Baby. See Switches, Battery & Baby Knife.
Lever Radio. See Radio Mounting.
Lever. See Switches, Snap, Lever.
Limit. See Controllers, Motor.
Mercury. See Switches, Mercury
Motor Starting. Magnetic Type. See Controllers.
Motor Starting. Non-Magnetic. See Switches, Motor Starting.
Pendant. See Switches, Snap.
Pressure Regulating. See Controllers.
Push Button, Snap. See Switches, Snap.
Push Button, Motor Starting. See Switches, Remote Control
Radio Receiver. See Radio Mountings.
Range. See Switches Snap; Heavy Duty

SPRINGS
Coiled wire springs; special shapes from brass, phosphor bronze, chrome vanadium, music, hard drawn or oil tempered wire. Also Cadmium plated springs.
by Hunter
HUNTER PRESSED STEEL CO.
Lansdale, Pa.

LEE-BUILT SPRINGS
For Every Purpose
LEE SPRING CO., INC.
34 Main St., Brooklyn, N.Y.

THE CHAS. FISCHER SPRING COMPANY
Springs of every description. Flexible Shafts, Metal and Wire Specialties. Write for prices.
238 KENT AVE., BROOKLYN, N.Y.

TO ANY SPRING USER

Consider *carefully* the advantage of placing your requirements with an organization operating two distinct plants... each fully equipped to meet easily the needs of any electrical device for flat or wire springs, small stampings or formed wires.

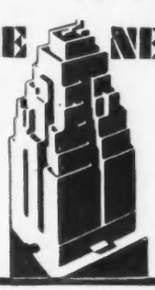
Address your inquiry to either division

BARNES-GIBSON-RAYMOND, INC.

COOK SPRING CO. DIV.
ANN ARBOR, MICHIGAN

DETROIT DIVISION
6400 MILLER AVENUE

BUSINESS MEN *say*
It's Good Business
to stop at
THE NEW YORKER



THERE'S something pleasantly prosperous in the sound of "You can get me at the Hotel New Yorker." That's just one of the reasons so many business men are always registered with us.

The New Yorker has 2500 rooms, every one with radio, tub and shower bath, Servidor and circulating ice water. There are four popular-priced restaurants, including Coffee Shop. Rates from $3.50 a day. 85% of the rooms are $5, or less.

The New Yorker is so easy to reach... from anywhere. Tunnel to Pennsylvania Station. B. & O. Motor Coach connections.

Manhattan's Largest and Tallest Hotel
34th Street at 8th Avenue, New York City
RALPH HITZ · Managing Director

Electrical Experts *are demanding*

JOHNSON'S
INDUSTRIAL TAPE

on practically all classes of work

THIS tape has won definite approval from experienced electrical engineers because of assured uniform results in practically every class of work, especially where a non-corrosive covering is desired or where small surface contact necessitates greater holding power than can be obtained through the use of ordinary friction tape.

Have you seen the new Johnson's Tape Dispenser? Holds full size roll of tape up to 1¼ inches wide. Enables you to cut any length of tape instantly. Eliminates pre-handling—no waste.

Testing Costs You Nothing

JOHNSON & JOHNSON, New Brunswick, N. J. E-M.N.
Please send free sample roll of Johnson's Industrial Tape and information on the Tape Dispenser.

Name _____
Company _____
Street and No. _____
City _____ *State* _____

SWITCHES (Switches)—Continued
Remote Control. See Switches, Remote Control.
Reversing. See Controllers.
Rotary. See Switches, Snap.
Safety. See Switches, Knife.
Snap. See Switches, Snap.
Starter Type. See Controllers.
Storage Battery. See Switches, Storage Battery.
Surface. See Switches, Snap.
Tank. See Switches, Tank.
Time. See Switches, Time.
Toggle. See Switches, Snap.
Tumbler. See Switches, Snap.

SWITCHES, Battery and Baby Knife

Cut-Out Switches.
Azal-Wood. See Kell & Son, Francis.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn. (Push Button.)
Bridgeport Switch Co., 209 Center, Bridgeport, Conn.
Bryant Electric Co., Bridgeport, Conn.
General Electric Vapor Lamp Co., 889 Adams, Hoboken, N.J.
Jefferson Electric Co., 1503 S. Laflin, Chicago, Ill.
Circle T. See Trumbull Elec. Mfg. Co.
Connecticut Elec. Mfg. Co., Bridgeport, Conn.
Crown. See Edwards & Co., Inc.
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee.
Diamond H. See Hart Mfg. Co.
Edwards & Co., Inc., 140th & Exterior, New York, N. Y.
Electrad, Inc., 428 Broadway, New York, N. Y.
Eureka. See Frank W. Morse & Co.
Fahnestock Elec. Co., cor. East Ave. and 8th, Long Island City, N. Y.
Handy. See Chicago Elec. Mfg. Co.
H. & H. See Arrow-Hart & Hegeman Elec. Co.
Hart Mfg. Co., Hartford, Conn.
Harwood. See Frank W. Morse & Co.
Heinemann Elec. Co., Trenton, N. J.
Jefferson Elec. Co., 1500 S. Laflin, Chicago, Ill.
Jost. See Frank W. Morse & Co.
Kappa. See Trumbull Elec. Mfg. Co.
Kell & Son, Francis, 401 E. 163rd, New York, N. Y.
Kendrick & Davis Co., Lebanon, N. H.
Keystone. See Frank W. Morse & Co.
King Mfg. Co., B. C., 302 Park Ave., Brooklyn, N. Y.
Knox Porcelain Corp., Knoxville, Tenn.
K-P-F Elec. Co., 855 Howard St., San Francisco, Cal.
Leviton Mfg. Co., 226 Newell, Brooklyn, N. Y.
Lyons Mfg. Co. (Mt. Carmel), New Haven, Conn.
Morse Co., Frank W., Boston, Mass.
Partrick & Wilkins Co., Philadelphia, Pa.
Porcelain Products, Inc., Findlay, Ohio.
Powerlite Switchboard Co., 4149 E. 79th, Cleveland, O.
Relistik Electric Co., 3145 Carroll Ave., Chicago, Ill.
Roach-Appleton Mfg. Co., 3440 N. Kimball Ave., Chicago.
Samson Electric Co., Canton, Mass.
Spero Elec. Mfg. Co., E. 33rd and Woodland Ave., Cleveland
Sta-Rite. See Frank W. Morse & Co.
Trumbull Elec. Mfg. Co., Plainville, Conn.
Wood Elec. Co., C. D., 565 Broadway, New York, N. Y.

SWITCHES, Mercury

(For Temperature Control Apparatus.)
Con-Tac-Tor. See Time-O-Stat Controls Co.
Dunco. See Struthers Dunn, Inc.
Fabrice Thermostatic Control Co., 4750 Sheridan Rd., Chicago, Ill.
General Electric Vapor Lamp Co., 883 Adams, Hoboken, N. J.
General Kontrolar Co., 200 E. First, Dayton, O.
Hart Mfg. Co., 230 Hamilton, Hartford, Conn.
Hywatt. See Time-O-Stat Controls Co.
Leland Electric Co., Dayton, O.
Kontax. See General Kontrolar Co. & Leland Electric Co.
Kontrolar. See General Kontrolar & Leland Electric Co.
Machlett & Son, 50 William, Long Island City, N. Y.
Mercoid Corp., 4201 Belmont Ave., Chicago, Ill.
Safetyl Regulator Co., 529 S. Mathews, Los Angeles, Cal.
Struthers Dunn, Inc., 138 N. Juniper, Philadelphia, Pa.
Time-O-Stat Controls Co., Elkhart, Ind.

SWITCHES, Motor Starting

Aces. See Colt's Patent Fire Arms Mfg. Co.
Adam Elec. Co., Frank, St. Louis, Mo.
Automatic Switch Co., 154 Grand, New York, N. Y.
Barber Elec. Mfg. Co., North Attleboro, Mass.
Bull Dog Electric Products Co., Detroit, Mich.
Circle T. See Trumbull Elec. Mfg. Co.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Columbia Metal Box Co., 260 E. 143rd, New York, N. Y.
Crouse-Hinds Co., Syracuse, N. Y.
E. W. See Trumbull Elec. Mfg. Co.
FA. See Adam Elec. Co., Frank.
F. A. Triumph. See Metropolitan Elec. Mfg. Co.
Federal Steel Products Co., 2 Ave. L., Newark, N. J.
Large-Dall Mfg. Co., 811 N. Tenth, Philadelphia, Pa.
Leonard Elec. Mfg. Co., 2907 Perkins Ave., Cleveland, O
Lundy Co., E. A., Fulton Bldg., Pittsburgh.
MacMillen Mfg. Co., 1400 N. Spring, Los Angeles, Cal.
Major. See Adam Elec. Co., Frank.
Metropolitan Device Corp., 1250 Atlantic Ave., Brooklyn, N. Y.
Metropolitan Elec. Mfg. Co., Blvd. at 14th, Long Island City, N. Y.
Murray. See Metropolitan Device Corp.
Mutual. See Bull Dog Elec. Products Co.
Naro. See Metropolitan Elec. Mfg. Co.
Noark. See Colt's Patent Fire Arms Mfg. Co.
Nublade. See Colt's Patent Fire Arms Mfg. Co.
Nuwuns. See Metropolitan Elec. Mfg. Co.
Palmer Elec. & Mfg. Co., Waltham, Mass.
Robbins & Myers, Inc., Springfield, O.
Safelock. See Westinghouse Elec. & Mfg. Co.
Schmuckler & Sons, 2232 N. 28th, Philadelphia, Pa.
Square D Co., Detroit, Mich.
Switchfuz. See Adam Elec. Co.
S. S. See Wadsworth Elec. Mfg. Co.
Tanner & Co., Wm. F., 511 Sharp, Baltimore, Md.
Trumbull Elec. Mfg. Co., Plainville, Conn.
Trumbull-Vanderpool Elec. Mfg. Co., Bantam, Conn.
Unisafti. See Metropolitan Device Corp.
Unit-Versal. See Bull Dog Elec. Products Co.
Universal Metal Box & Products Co.
V V. Fittings Co., 711 Cherry, Philadelphia, Pa.
Wadsworth Elec. Mfg. Co., Covington, Ky.
Westinghouse Elec. & Mfg. Co., Mansfield, O.

SWITCHES, Remote Control

Push Button, Magnetically Operated.
Adam Electric Co., Frank, St. Louis, Mo.
Allen-Bradley Co., 493 Clinton, Milwaukee, Wis.
Anderson & Co., C. J., 212 W. Austin Ave., Chicago, Ill.
Automatic Elec. Mfg. Co., Mankato, Minn.
Automatic Switch Co., 154 Grand, New York, N. Y.
Automatic Temperature Control, 34 E. Logan, Philadelphia.
Burke Controller Co., 369 Lexington Ave., New York, N. Y.
Clark Controller Co., 1144 E. 152nd, Cleveland, O.
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee.
Diamond H. See Hart Mfg. Co.
Darrin. See Automatic Switch Co.
Dunco. See Struthers Dunn, Inc.
Electric Valve Mfg. Co., 64 Murray, New York, N. Y.
General Electric Co., Section W-329, Bridgeport, Conn.
Hart Mfg. Co., Hartford, Conn.
H. P. See Palmer Elec. & Mfg. Co.
Industrial Controller Div. of Square Co., S. Pierce & Hanover Sts., Milwaukee, Wis.
Kato. See Automatic Elec. Mfg. Co.
Lincoln Elec. Co., Cott Rd. & Kirby Ave., Cleveland, O.
Major, F. A., System. See Adam Elec. Co.
Monitor Controller Co., 51 S. Gay, Baltimore, Md.
Palmer Elec. & Mfg. Co., Waltham, Mass.
Precise Mfg. Co., 254 Mill, Rochester, N. Y.
Protectoswitch. See Precise Mfg. Co.
R. C. O. C. See South Bend Current Controller Co.
Ross Safety Switch Corp., 1 E. 42nd, New York, N. Y.
Signal Engineering & Mfg. Co., 154 W. 14th, New York.
South Bend Current Controller Co., 247 La Porte, South Bend, Ind.
States Co., 19 New Park Ave., Hartford, Conn.
Struthers Dunn, Inc., 138 N. Juniper, Philadelphia, Pa.
Takamine Corp., 208 Rawson St., Long Island City, N. Y.
Teeple Co., L. B., 540 E. Ninth, Portland, Ore.
Triplock. See Monitor Controller Co.
Trumbull Elec. Mfg. Co., Plainville, Conn.
Zenith Elec Co 537 S. Dearborn, Chicago, Ill.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.

SWITCHES, Snap

	KEY
Feed Through	See p
Fixture (Canopy, Candelabra and Key Arm)	See F
Flush	See f
Lever, Toggle, Tumbler	See L
Pendant	See p
Push Button	See P
Rotary	See R
Surface	See s

See Also Switches, Snap; Heavy Duty.
Adam Electric Co., Frank, St. Louis, Mo. f . . . . . .
Anylite Elec. Co., 200 Murray, Ft. Wayne, Ind.
Arrow-Hart & Hegeman Elec Co., Hartford, Conn. . . . . fsp P R L F
Arrow Head. See Arrow Elec.
Beaver Mfg. Co., 625 N. Third, Newark, N. J. . . . . f p P . . . F
East. See United States Elec. Mfg. Corp.
Brascolite. See Guth & Co., Edwin.
Bremer Elec. Mfg. Co., 139 N. 7th, Philadelphia, Pa. . . . . f . . . . . .
Bridgeport Switch Co., 209 Center, Bridgeport, Conn. . . . . L F
Bryant Elec. Co., Bridgeport, Conn. . . . . f sp P R L F
R. S. Co. See Bridgeport Switch Co.
Carling Tool && Machine Co., 618 Capitol Ave., Hartford, Conn. . . . . F
Commercial. See Gaynor Electric Co.
Connecticut Elec. Mfg. Co., Bridgeport, Conn. . . . . p P R L F
Crouse-Hinds Co., Syracuse, N. Y. . . . . L . .
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee, Wis. . . . . P . . . . L . .
Diamond H. See Hart Mfg. Co.
Dugie. See Bryant Elec Co.
Gaynor Elec. Co., Stratford, Conn. . . . . f . . . . . L . .
General Elec. Co., Section W-329, Bridgeport, Conn. . . . . fsp P R L F
Glo-Guide See Bryant Elec. Co.
Gold Star Push Switch. See Arrow-Hart & Hegeman Elec. Co.
Guth & Co., Edwin, 2625 Washington Ave., St. Louis, Mo. . . . . F
Hart Mfg Co., Hartford, Conn. . . . . f sp P R L . .
Hart & Hegeman, Div. of Arrow-Hart & Hegeman Elec. Co. (Door Bolt Control) f sp P R L F
Hart. See Hart & Hegeman.
H. & H. See Hart & Hegeman Mfg. Co.
Hubbell, Inc., Harvey, Bridgeport, Conn. . . sp . . . . L F
Kell & Son, Francis, 401 E. 163rd, New York, N. Y. . . . . f . . P . . . . .
Leviton Mfg. Co., 226 Newell, Brooklyn . . . . . F
Levolier. See McGill Mfg. Co.
McGill Mfg. Co., Valparaiso, Ind. . . . . f . . . . . L F
Marks Products Co., 80 N. Ninth, Brooklyn, N. Y. . . . . L F
Metropolitan Elec. Mfg. Co., Blvd at 14th St., Long Island City, N. Y. . . . . s . . R . . .
Morse Co., Frank W., 291 Congress, Boston . . . P . . . . .
National. See Standard Elec. Mfg. Co.
New England. See Paulding, John L.
Nutmeg See Hubbell, Harvey, Inc.
Pass & Seymour, Div. H, Solvay Sts., Syracuse, N. Y. . . . . f sp P . . L F
Pauliding, John I, New Bedford, Mass. . . . f s P . . . . .
Pen Tap. See Beaver Mfg. Co.
Perkins. See Bryant Elec. Co.
Pilot Radio & Tube Corp., 323 Berry, Brooklyn, N. Y. . . . . L . .
Pilotoggle. See Pilot Radio & Tube Corp.
Pilotoggle. See Pilot Elec. Mfg. Co.
Pullrite. See Morse, Frank W.
Rhodes, Inc., M. H., Chamber of Commerce Bldg. New Haven, Conn. . . . . L . .
Rodale Mfg. Co., Emaus, Pa. . . . . p . . . . . .
Sears, Henry D., 80 Boylston, Boston . . f sp P R L F
Smith & Co., T. C., 3915 Powelton Ave., Philadelphia, Pa. . . . . P . . . . .
Snapit. See Marks Products Co.
Spartan. See Bryant Elec. Co.
Standard Elec. Mfg. Co., 941 Wrightwood Ave., Chicago, Ill. . . . . f s P R L . .
Starite. See Morse Co., Frank W.
Trigie. See Bryant Elec. Co.
Tumbolier. See Hart & Hegeman.
Twi-Lite See McGill Mfg. Co.
United States Elec. Mfg. Corp., 222 W. 114th, New York, N. Y. . . . . f . . . . . .
Victor. See Kell & Son, Francis.
Washington. See Gaynor Electric Co.
Weber. See Sears, Henry D.
Yankee. See Bryant Elec. Co.

SWITCHES, Snap; Heavy Duty

Heavy duty rotary snap switches for Electric Range and Small Motor Control
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Black & Decker Co., Kent, O.
Bryant Electric Co., 1421 State, Bridgeport, Conn.
Diamond H. See Hart Mfg. Co.
Domestic Electric Co., Kent, O.
General Electric Co., Section W-329, Bridgeport, Conn.
Hart Mfg. Co., Hartford, Conn.

SWITCHES, Storage Battery; Automatic Disconnecting

Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee.
Penn Electric Switch Co., E. 20th & Walnut Sts., Des Moines, Ia.
Radioloc. See Cutler-Hammer Mfg. Co.

SWITCHES, Tank

Anderson & Co., C. J., 212 W. Austin Ave., Chicago, Ill.
Blackburn-Smith Corp., 25 W. 45th, New York, N. Y.
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee.
General Electric Co., Schenectady, N. Y.
Industrial Controller Div. of Square Co., S. Pierce & Hanover Sts., Milwaukee, Wis.
Ostrander Elec. Wks., W. R., 911 Atlantic Ave., Brooklyn.
Pean Elec. Switch Co., 20th & Walnut, Des Moines, Ia.
Roberts & Kanze Elecl. Repair Co., 240 W. 25th, New York.
Sundh Elec. Co., 209 Parkhurst, Newark, N. J.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

SWITCHES, Time (Automatic Clock Operated Switches)

Ace. See Reliance Automatic Ltg. Co.
Anderson Mfg. Co., Albert & J. M., 289 A, Boston, Mass.
Astrachron. See Gem Engineering Co.
Automatic Elec. Mfg. Co., Mankato, Minn.
Automatic Lighting Co., 831 Greenmount Ave., Baltimore.
Brown & Pengilly, Inc., 1264 Folsom, San Francisco, Cal.
Buckeye Time Switches, Inc., 1557 St. Clair Ave., Cleveland, O.
Campbell Electric Mfg. Co., 15 Stewart, Lynn, Mass.
Cramer & Co., R. W., 67 Irving Pl., New York, N. Y.
Electric Clock Corp. of America, 500 S. Throop, Chicago, Ill.
Electric Steam Radiator Co., 513 Stewart, Seattle, Wash.
Eureka Tool & Machine Co., 42 Walnut, Newark, N. J.
Frisch, Walter P., 104 Linden, Rochester, N. Y.
Gem Engineering Co., Hempstead, N. Y.
General Electric Co., Schenectady, N. Y.
Go-N-Set. See G. & S. Research Lab.
G. & S. Research Laboratory, 1269 Cochran Ave., Los Angeles, Cal.
Hart Mfg. Co., Hartford, Conn.
Horni Signal Mfg. Co., 290 Hudson, New York, N. Y.
Horolectrical Corp., 116 W. 14th, New York, N. Y.
Jewel. See Time Switch Sales & Service.
Kwixset. See Thompson Clock Co.
Lamp-Lighter. See Robbins & Myers Co.
Liberty Bell Mfg. Co., Minerva, Ohio.
Mercury Time Switch Co., Marine City, Mich.
New Haven Clock Co. (Elm City), New Haven, Conn.
Northwestern Clock Co., 515 Brown Bldg., Omaha, Neb.
Paragon Elec. Co., 407 S. Dearborn, Chicago, Ill.
Racine. See Reliance Automatic Ltg. Co.
Radio Owl, 2269 E. 51st, Los Angeles, Cal.
Radio Switchman. See New Haven Clock Co.
Reliance Automatic Ltg. Co., 1925 Meade, Racine, Wis.
Research Mfg. Laboratory, 1269 Cochran Ave., Los Angeles
Rhodes, Inc., M. H., Chamber of Commerce Bldg., New Haven, Conn.
Robbins & Myers Co., Springfield, O.
Ross Safety Switch Corp., 1 E. 42nd, New York, N. Y.
Sangamo Elec. Co., Springfield, Ill.
Sauter. See Cramer & Co.
Sentinel. See Electric Steam Radiator Co.
Stat-Amatic Instrument & Appliance Co., Hartford, Conn.
States Co., Hartford, Conn.
Stromberg Electric Co., 223 W. Erie, Chicago, Ill.
Thompson Clock Co., H. C., Bristol, Conn.
Time Switch Sales & Service, 1841 Euclid Ave., Cleveland.
York Clocks, Inc., 12 E. 41st, New York, N. Y.
Walser Automatic Timer Co., 405 Lexington Ave., New York. (Also Coin Operated.)
X-L Radio Laboratories, 1224 Belmont Ave., Chicago, Ill. (Timer.)
Zenith Elec. Co., 537 S. Dearborn, Chicago, Ill.

TACHOMETERS

Speed Indicators, Speedometers, Revolution Counters.
Biddle, James G., 1211 Arch, Philadelphia, Pa.
Brown Instrument Co., Wayne & Windrim, Philadelphia.
Comet Elec. Co., 47 Union Trust Bldg., Indianapolis, Ind.
Durant Mfg. Co., 655 Buffum, Milwaukee, Wis.
Electric Tachometer Corp., Spring Garden & Broad St., Philadelphia, Pa.
Holtzer-Cabot Elec. Co., Boston, Mass.
Leeds & Northrup Co., 4901 Stenten Ave., Philadelphia, Pa.
Misener Mfg. Co., 326 E. Washington, Syracuse, N. Y.
Productimeter. See Durant Mfg. Co.
Standeo. See Sticht & Co.
States Co., 19 New Park Ave., Hartford, Conn.
Sticht & Co., H. H., 13 Park Row, New York, N. Y.
Teteo-Tim. See Elec. Tachometer Corp.
Veeder-Root, Inc., 14 Sargeant, Hartford, Conn.
Weston Elecl. Instrument Co., 582 Frelinghuysen Ave., Newark, N. J.
Zernickow Co., O., 15 Park Row, New York, N. Y.

TAGS, Cable; Pole and Battery

American Radio Hardware Co., 135 Grand, New York, N. Y. (Battery Lead Tags.)
Bennett Mfg. Co., East Syracuse, N. Y.
Brecklin Underground Elec'l Mfg. Co., Glenside, Pa.
Crowe Name Plate & Mfg. Co., 1749 Grace, Chicago, Ill.
Grammes & Sons, Inc., L. F., Allentown, Pa.
International Tag Co., 319 N. Whipple, Chicago, Ill.
Matthews & Co., Jas. H., 3942 Forbes, Pittsburgh, Pa.
Premax Products, Inc., 230 Tenth, Niagara Falls, N. Y.
Viking Tool & Machine Co., 745 65th, Brooklyn, N. Y.
Waterbury Button Co. (Elecl. Mfg. Dept.), Waterbury Conn

TAGS, Shipping

Campbell Paper Box Co., 904 S. Main, South Bend, Ind.
International Tag Co., 319 W. Whipple, Chicago, Ill.

TAMPING TOOLS. See Tools, Commutator Truing.

TANK SWITCHES. See Switches, Tank.

TANKS, OIL SWITCH & BREAKER. See Cabinets, Sheet Steel.

TANKS, TINNING. See Wire Manufacturing Machines.

TANTALUM

Fansteel Products Co., Inc., North Chicago, Ill.

TAPE, Asbestos

American Asbestos Co., Norristown, Pa.
Ferodo & Asbestos, Inc., New Brunswick, N. J.
Johns-Manville Corp., New York N. Y.
Matthews & Co., Jas. H., 3942 Forbes, Pittsburgh, Pa.
Micalite. See Mitchell-Rand Mfg. Co.
Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y
Niagrite. See Johns-Manville, Inc.
Shield Brand. See Mitchell-Rand Mfg. Co.

TAPE, Cotton, Linen, Silk; Tape, Sleeving, Webbing.

Anchor Webbing Co., 300 Brook, Pawtucket, R. I. (Cotton Silk).
Arbeka Webbing Co., Pawtucket, R. I.
Awebco. See Anchor Webbing Co.
Eagle See Sidebotham, Inc., John.
Elizabeth Webbing Mills, Inc., Pawtucket, R. I.
General Electric Co., Schenectady, N. Y.
Hope Webbing Co., 1005 Main, Providence, R. I.
Krout & Fite Mfg. Co., Allegheny Ave. & Emerald Philadelphia, Pa.
Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y.
Pearce Co., R. T., Covington, Ky.
Shield Brand. See Mitchell-Rand Mfg. Co.
Sidebotham, Inc., John, 4317 Griscom, Philadelphia, Pa
Smith Belting Co. (Germantown), Philadelphia, Pa.

While extremely sensitive, this instrument is rugged, foolproof and requires no skill to operate.

It reduces inspection costs and increases production — 2000 tests each hour are not at all unusual.

If coils of special shape or size are to be tested we can supply test fixture to suit.

Write for Bulletin 1090

This tester will detect the weak spots in any coil or winding

•

RUBICON CO.
29 N. Sixth St.
Philadelphia

ACME WIRE PRODUCTS

Magnet Wire — All Insulations,
Coils — Magnet Wire Wound,
Varnished Insulations,
Parvolt Filter and By Pass Condensers

All Products Made to Recognized Commercial Standards Including Those of:
National Electric Mfrs. Assn.
Radio Manufacturers Assn.
American Society for Testing Materials

For more than 25 years manufacturers and suppliers to the largest and most discriminating users.

THE ACME WIRE CO.

New Haven, Conn.

Branch Offices

New York
52 Vanderbilt Avenue

Cleveland
Guardian Building

Chicago
842 North Michigan Avenue

IDEAL UNIVERSAL CONNECTORS

To Men Who Answer Advertisements

Some men never hesitate to send in a coupon like the one below when they see that their action will lead to securing a money saving idea. And what a saving Ideal Connectors can really make.

Ideal Wire Connectors screw over the wire ends like a nut. They are quick and afford real protection. They eliminate the use of solder or tape. The elimination of either a soldering or taping operation in a plant often means the saving of thousands of dollars.

And that's just what Ideals can do in your plant. Ideals are fully approved by the National Board of Fire Underwriters and the Mutual Laboratories. Manufacturers of refrigerators, vacuum cleaners, oil burners, electric tools, machines, lamps and fixtures are now using Ideal Connectors on all their devices. They are saving many hours of labor—speeding up production and at the same time have raised the quality of their product.

Send in the coupon below. Let us quote prices and send free samples.

IDEAL COMMUTATOR DRESSER COMPANY
1008 Park Ave.,
SYCAMORE, ILL.

Ideal Commutator Dresser Co. 11-30
1008 Park Ave.,
Sycamore, Ill.

Gentlemen:—
We are interested in receiving free samples and prices on Ideal Connectors.

Name .....
Company Name .....
Address .....
Town .....State .....
We would use approximately.....annually

TAPE, COTTON, LINEN, SILK—Continued
Superfine. See Windsor Webbing Co.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Windsor Webbing Co., Pawtucket, R. I.
Worcester Braiding Co., 84 Southbridge, Worcester, Mass.

TAPE, Mica

Continental Diamond Fibre Co., Newark, Del.
Mica Insulator Co., 200 Varick, New York, N. Y.
Micalite. See Mitchell-Rand Mfg. Co.
Mica Mfg. Co., 135 Johnson, Brooklyn, N. Y.
Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

TAPE, Rubber and Friction

Ackerman. See Ackurate Rubber Co.
Ackurate Rubber Co., 25 Beaver St., New York, N. Y.
Adamson & Co., Joseph, Columbia and Germantown Aves. Philadelphia, Pa.
Adhere. See Westinghouse Elec. & Mfg. Co.
Alpha. See Johns-Manville, Inc.
Amazon. See Graybar Elec. Co.
Appleton Rubber Co., Franklin, Mass.
Black Diamond. See Dunton Co., M. W.
Boston Woven Hose & Rubber Co., Boston, Mass.
Brooklyn. See Johns-Manville, Inc.
Bull-Dog. See Boston Woven Hose & Rubber Co.
Candee. See Ackurate Rubber Co.
Canfield Rubber Co., Bridgeport, Conn.
Canton. See Plymouth Rubber Co.
Clifton. See Clifton Mfg. Co.
Clifton Mfg. Co., 65 Brookside Ave., Boston 30, Mass.
Competition. See New York Insulated Wire Co.
Double-Wear. See Dryden Rubber Co.
Consumers Rubber Co., 1302 Ontario, N., Cleveland, O.
Coruco. See Consumers Rubber Co.
Criterion. See Consumers Rubber Co.
Dryden Rubber Co., 1014 S. Kildare Ave., Chicago, Ill.
Dundee, A. & B. See Okonite Co.
Dunton Co., M. W., 670 Eddy St., Providence, R. I.
Dutch-Brand. See Van Cleef Bros.
Elkhart Rubber Wks., Elkhart, Ind.
Firestone Tire & Rubber Co., Akron, O.
General Electric Co., Section W-329, Bridgeport, Conn.
Graybar Elec. Co., Graybar Bldg., New York, N. Y.
Grimshaw. See New York Insulated Wire Co.
Gritptite. See Canfield Rubber Co.
Holfast Rubber Co., Atlanta, Ga.
Holditite. See United States Rubber Co.
Hydro-Proof. See Elkhart Rubber Wks.
Imperial Rubber Co., 220 Broadway, New York N. Y.
Impervo. See Canfield Rubber Co.
Irco. See Imperial Rubber Co.
Johnson & Johnson, New Brunswick, N. J.
Johns-Manville Corp., New York, N. Y.
Jomanco. See Johns-Manville, Inc.
Jonflex. See Johnson & Johnson.
Kerite Ins. Wire & Cable Co., 30 Church, New York, N. Y.
Manson. See Okonite Co.
Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y.
New York Insulated Wire Co., 114 Liberty, New York, N. Y.
Nox-Ill. See Consumers Rubber Co.
Okonite Co., Passaic, N. J.
O. K. See Appleton Rubber Co.
F. & B. See Ruberoid Co.
Paratex. See Appleton Rubber Co.
Paruco. See Passaic Rubber Co.
Passaic Rubber Co., Clifton, N. J.
Plymouth Rubber Co., 1400 Revere, Canton, Mass.
Red-X. See United States Rubber Cement Co.
Reflo. See United States Rubber Co.
Ruberoid Co., 95 Madison Ave., New York, N. Y.
Sitco. See Superior Insulation Tape Co.
Slipknot. See Plymouth Rubber Co.
Star. See Sullivan & Sons Mfg. Co., J.
Sticks. See Graybar Elec. Co.
Stitwell. See Clifton Mfg. Co.
Sullivan & Sons Mfg. Co., J., 2294 N. 9th, Philadelphia, Pa.
Superior Insulating Tape Co., 3044 Lambain Ave., St. Louis.
2-Plex. See Holfast Rubber Co.
U. S. See United States Rubber Co.
United States Rubber Co., 1790 Broadway, New York, N. Y.
Usco. See United States Rubber Co.
Van Cleef Bros., 7722 Woodlawn Ave., Chicago.
Victor. See Graybar Elec. Co.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.

TAPE, Varnished Fabric

Acme Wire Co., New Haven, Conn.
Continental Diamond Fibre Co., Newark, Del.
General Electric Co., Section W-329, Bridgeport, Conn.
Irv-O-Flatsemp. See Continental Diamond Fibre Co.
Mica Insulator Co., 200 Varick, New York, N. Y.
Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y.
New Jersey Wood Finishing Co., Amboy Ave., Woodbridge, N. J.
Radiotape. See Respro, Inc.
Respro, Inc., Wellington Ave. (Auburn), Providence, R. I.
Shield Brand. See Mitchell-Rand Mfg. Co.
Sico. See Standard Insulator Co.
Standard Insulation Co., East Rutherford, N. J.
Voltape. See Respro, Inc.

TAPING MACHINES, Coil

Chapman Electric Works, P. E., 1820 Chouteau Ave., St. Louis, Mo.
Columbia Machine Works & Malleable Iron Co., 263 Chestnut, Brooklyn, N. Y.
Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.
Griswold Machine Co., George, New Haven, Conn.
Ridlon Company, Frank, Boston, Mass.
Secur. See Electric Service Supplies Co.
Seifert, E. R., Syracuse, N. Y. (Automatic.)

TAPING MACHINES, Wire

American Insulating Machinery Co., 519 Huntington Ave., Philadelphia, Pa.
Wire Machinery Corp. of Am., New Haven, Conn.

TAPS. See Stocks, Dies and Reamers.

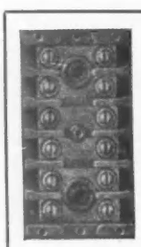
TENSION DEVICES, Coil Wire. See Racks, Wire Reel

TENSION MACHINES, Band Wire

Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.
Peerless. See Electric Service Supplies Co.

TERMINALS AND CONNECTORS

Low Tension, Secondary Terminals and Connectors.
All-in-One. See Ohio Parts Co.
Barcy-Nicholson Co., 2801 Fort, W., Detroit, Mich.
Bassett Metal Goods Co., Derby, Conn. (General Selling Agent, Hatheway & Co., 16 Hudson, New York, N. Y.
Burten-Rogers Co., Boston, Mass.
Clark Metal Products, 490 Hancock Ave., Bridgeport.
Dixie Supply Co., 91 7th Ave., New York.
Double Grip. See Pons, Eugene
Eagle Elec. Mfg. Co., 79 Hall, Brooklyn, N. Y.
Electron. See Bassett Metal Goods Co.
Fahnestock Elec. Co., East Ave. and 8th, Long Island City, N. Y.



PENN-UNION TERMINAL BLOCKS

in new and improved designs are space savers yet have ample room for making connection. Write for special bulletin.

PENN-UNION ELECTRIC CORP.
ERIE, PA.

Grammes & Sons, Inc., L. F., Allentown, Pa.
Ideal Clamp Mfg. Co., 198 Bradford, Brooklyn, N. Y.
Ilsco Copper Tube & Products, Inc., 5629 Madison Rd., Cincinnati, O.
K. E. M. See Kulier Elec. Mfg. Co.
Kulier Elec. Mfg. Co., 575 Pierce Ave., Long Island City
Morse Co., Frank W., 291 Congress, Boston, Mass.
Nu-Way Snap. See Hatheway Mfg. Co.
Ohio Parts Co., 3301 Colerain Ave., Cincinnati, O.
Orum, S. R. M., 503 N. 11th, Philadelphia, Pa.
Patton-MacGuyer Co., Providence, R. I.
Rajah Co., Bloomfield, N. J.
Salem Elec'l Supply Co., 285½ Bridge, Salem, Mass.
Sherman Mfg. Co., H. B., Battle Creek, Mich.
Shuro. See Burton-Rogers Co.
Tinkerbox. See Weber Elec. Wks.
Waterbury Button Co. (Elect. Mfg. Dept.), Watebury, Conn.
Weber Elec. Wks., Brooklyn Sta., Cleveland, O.
Wolverine Tube Co., 1431 Central Ave., Detroit, Mich.
Zierick Machine Wks., F. R., 68 East 131st, New York.

TERMINAL BLOCKS

Penn Union Elec. Corp., Erie, Pa.

TEST BENCHES, Armature

Allen Electric & Equipment Co., Kalamazoo, Michigan.
Burton-Rogers Co., Boston, Mass.
Hobart Bros. Co., Troy, Ohio.
Marshall Elec. Co., Elkhart, Ind.
Miho Company, 717 Sycamore, Cincinnati, Ohio.
North East Appliance Corp., Rochester, N. Y.
Pence & Son, H. O., San Luis Obispo, Cal.
Weidenhoff, Joseph, 4352 Roosevelt Road, Chicago, Ill.

TESTERS, Coil

(Includes Armature Growlers, trouble shooters, and other portable testing devices). See also Instruments
Ace. See Weidenhoff, Joseph.
Allen-Bradley Co., 493 Clinton, Milwaukee, Wis.
Allen Electric & Equipment Co., Kalamazoo, Michigan.
Ankenbrandt, J. J., 2140 Wakeman, Toledo, Ohio.
Armeter. See Chapman Electric Works, P. E.
Burton-Rogers Co., 857 Boyleston, Boston, Mass.
Century Electrical Co., 100 Randall Ave., Syracuse, N. Y.
Chapman Elec'l Works, P. E., 1820 Chouteau Ave., St. Louis.
Cleveland Steel Products Corp., 7306 Madison Ave., Cleveland, O.
Colpin Corp., 6110 S. Main, Los Angeles, Cal.
Columbia. See Weidenhoff, Joseph.
Comparometer Co., New Ulm, Minn.
Economy. See Weidenhoff, Joseph.
Electric Controller & Mfg. Co., 2760 E. 79th, Cleveland.
Electrotest. See Comparometer Company.
Ev-Ri-Test. See Weidenheff, Joseph.
Ga-Jit. See General Instrument Corp.
General Instrument Corp., 225 Varick, New York, N. Y.
Hobart Bros. Co., Troy, Ohio.
Ideal. See Ankenbrandt, J. J.
Indiana Mfg. & Electric Co., Marion, Indiana.
Kurman Engineering Corp., 22-14 40th Ave., Long Island City, N. Y.
Leich Electric Co., Genoa, Ill.
Lundin Electric Machine Co., 10 Thacher, Boston, Mass.
Mallory Electric Co., Factories Bldg., Toledo, Ohio.
Marshall Elec. Co., Elkhart, Ind.
Miho Company, 717 Sycamore, Cincinnati, Ohio.
North East Appliance Corp., Rochester, N. Y.
Onan, David W., 43 Royalstone Ave., Minneapolis, Minn.
Paneltest. See Allen Elec. & Equip. Co.
Portometer. See Allen Elec. & Equip. Co.
Portostat. See Allen Elec. & Equip. Co.
Presto. See Metal Specialties Mfg. Co.
Rex Batrystat. See Bartlett Products Co
Rubicon Co., 29 N. Sixth, Philadelphia, Pa.
Scout. See Leich Electric Company.
States Co., 19 New Park Ave., Hartford, Conn. (Transformer Test Table)
Test-All. See Colpin Corp.
Test-O-Meter. See Weidenhoff, Joseph.
Test-Rite. See Colpin Corp.
Victory. See Weidenhoff, Joseph.
Weidenhoff, Joseph, 4352 Roosevelt Road, Chicago, Ill.

TESTING INSTRUMENTS. See Instruments.

TESTING LABORATORIES

Baker & Co., Inc., 54 Austin, Newark, N. J.
Elec'l Testing Laboratories, 80th St. and East End Ave., New York, N. Y.
National Elec'l Inst. Co., 162 Sidney, Cambridge, Mass.
New York Testing Laboratories, 80 Washington, New York
Rubicon Co., 29 N. Sixth, Philadelphia, Pa.

TESTING OVENS. See Ovens, Industrial and Laboratory.

THERMO JUNCTIONS. See Instruments, Laboratory Standard.

THERMOSTATIC METAL

Baker & Co., Inc., 54 Austin, Newark, N. J.
Chace Valve Co., W. M., 1608 Beard Ave., Detroit, Mich.
Coffin Mfg. Co., B. F., 30 Court, Newark, N. J.
Cook Plate Co., Edw. N., 70 Ship, Providence, R. I.
General Plate Co., Attleboro, Mass.
Improved Seamless Wire Co., 775 Eddy, Providence, R. I.

THERMOSTATIC METAL

For Low and High Temperatures

Our No. 1800 metal for temperatures up to 450° F.

Our No. 2800 metal for temperatures up to 1500° F.

W. M. CHACE VALVE COMPANY
1600 Beard Avenue, Detroit, Mich.

Interstate Products Corp., 503 Mulberry, Newark, N. J.
National-Harris Wire Co., Newark, N. J.
Venbur. See Coffin Mfg. Co., B. F.
Wilco. See H. A. Wilson Co.
Wilson Co., H. A., Newark, N. J.

THERMOSTATS

Airswitch. See Time-O-Stat Controls Co.
American Thermostat Co., 226 Jelliff Ave., Newark, N. J.
Automatic Appliance Co., Jackson, Mich.
Bake-O-Meter. See Cooper Oven Thermometer Co.
Bak-Rite. See Electric Appliance Mfg. Co.
Bishop & Babcock Sales Co., 4901 Hamilton Ave., N. E., Cleveland, O.
Boston Machine Wks. Co., 7 Willow, Lynn, Mass.
Brown. See Electric Automatic Appliance Co.
Brown Instrument Co., Wayne & Windrim, Philadelphia, Pa.
Burke Controller Co., 369 Lexington Ave., New York, N. Y.
Coffin Mfg. Co., B. F., 30 Court, Newark, N. J.
Cooper Oven Thermometer Co., Pequabuck, Conn.
Diamond H. See Hart Mfg. Co.
Dunco. See Struthers Dunn, Inc.
Electric Automatic Appliance Co., 1748 Arapahoe, Denver, Colo.
Electric Heat Control Co., 5902 Carnegie Ave., Cleveland, O.
Electric Maid. See Hankscraft Co.
Fraser Thermo Electric Co., 1206 S. Grove, Irvington, N. J.
General Electric Co., Schenectady, N. Y. (For Melting Pot.)
Ideal Mfg. Co., Battle Creek, Mich.
Hankscraft Co., 121 N. Dickinson, Madison, Wis.
Hart Mfg. Co., Hartford, Conn.
Hi-Lo. See Boston Machine Wks. Co.
Hynes & Cox Elec. Corp., 406 N. Pearl, Albany, N. Y.
Interstate Products Corp., 503 Mulberry, Newark, N. J.
King. See Electric Heat Control Co.
Klixon. See Westinghouse Electric & Mfg. Co.
Marvel. See American Thermostat Co.
Mercoid Corp., 4201 Belmont Ave., Chicago, Ill.
Moeller Instrument Co., 261 Sumpter, Brooklyn, N. Y.
National Steel Construction Co., 425 Fountenae, Seattle Wash.
Pyratherm. See Mercoid Corp.
Safety Regulator Co., 529 S. Mathews, Los Angeles, Cal.
Savutime Devices, Inc., 85 Manhattan, Rochester, N. Y.
Stat-Amatic Instrument & Appliance Co., Hartford, Conn.
Struthers Dunn, Inc., 138 N. Juniper, Philadelphia, Pa.
Tagliabue Mfg. Co., C. J., 18 33rd, Brooklyn, N. Y.
Teeple Co., L. R., 540 E. 9th, Portland, Ore.
Thermolectric. See Bishop & Babcock Sales Co.
Time-O-Stat Controls Co., Elkhart, Ind.
Trent Co., Harold E., 439 N. 12th, Philadelphia, Pa.
Visaflame. See Mercoid Corp.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Wilcolator Co., Newark, N. J.

TIGHTENERS, Commutator

Blaes Engineering Works, Chas. F., 230 N. Morgan, Chicago, Ill.

TIME SWITCHES. See Switches, Time.

TIN FOIL

Cobb Elec. Appliance Co., 100 Massachusetts Ave., Boston.
Lehmaier, Schwartz & Co., 521 W. 25th, New York, N. Y.
United States Foil Co., 30th & Grand Sts., Louisville, Ky.

TINNING TANKS, WIRE. See Wire Manufacturing Machines.

TINSEL. See Tinsel, Cord & Thread.

TINSEL, Cord and Thread

Belden Mfg. Co., 4633 W. Van Buren, Chicago, Ill.
Diamond Braiding Mills, Chicago Heights, Chicago, Ill
Empire Notion Co., 335 W. 35th, New York, N. Y.
Frank & Co., M. J., 15 W. 39th St., New York, N. Y.
General Electric Co., Section W-329, Bridgeport, Conn.
Hy-Sil Mfg. Co., Revere, Mass.
Kibe Co., 2 E. 23rd, New York, N. Y.
Koehn, Frederick C., Real Estate Trust Bldg., Philadelphia
Lees Mfg. Co., 320 Broadway, New York, N. Y.
Montgomery Co., J. R., Windsor Locks, Conn.
Rockbestos Products Corp., 389 Nicoll, New Haven, Conn.
Springfield Wire & Tinsel Co., Springfield, Mass.
Walco. See Waldman Mfg. Co.
Waldman Mfg. Co., 127 Blackstone, Providence, R. I.

TIPS, Cord

Duro. See McEvoy, C. H.
General Cable Corp., 420 Lexington Ave., New York, N. Y.
McEvoy, C. H., 430 Broadway, Lowell, Mass.
National Acme Mfg. Co., 7500 Stanton Ave., Cleveland, O.
Nerden & Co., S. 180 S. Water, Providence, R. I.
Waterbury Brass Goods Corp., Waterbury, Conn.

TOOLS, Commutator Slotting. See Slotting Machines & Tools, Commutator.

TOOLS, Coil Tamping

Ideal Commutator Dresser Co., 1008 Park Ave., Sycamore, Ill.

TOOLS, Commutator Truing

Acme. See Green Equipment Corp.
Allen Elec. & Equipment Co., Kalamazoo, Mich.
Binghamton Flexible Shaft Co., Binghamton, N. Y.
Central Mfg. Co., Fairfield, Ia.
Green Equipment Corp., 260 Monadnock Block, Chicago, Ill.
Ideal Commutator Dresser Co., 1008 Park Ave., Sycamore, Ill.
Imperial. See Martindale Elec. Co.
Jordan Bros., 74 Beekman, New York, N. Y.
Martindale Elec. Co., 1262 W. Fourth, Cleveland, Ohio.

TOOLS, Storage Battery

Babbett Elec. Mfg. Co., 4307 Cottage Grove Ave., Chicago, Ill. (Knife Heaters.)
Canedy-Otto Mfg. Co., 1816 McGee, Chicago Heights, Ill (Floor Vises.)
Cleveland Steel Products Corp., 7306 Madison Ave., Cleveland, O. (Steamer and Still, Filler, Separator Cutter, Clips, Carrier, Post Cutter, Terminal and Cell Puller.)
General Elec. Co., Schenectady. (Lead Burning Outfits.)
Heet-A-Knife. See Bobbett Elec. Mfg. Co.
Ohio Parts Co., 3301 Colerain Ave. Cincinnati. (Terminals.)
Op-Al Elec. & Mfg. Co., 1057 E. 30th St., Indianapolis, Ind. (Knife Heaters.)
Orum, S. R. M., 503 N. 11th, Philadelphia, Pa. (Pillar Post Sleeves, Tongs, Reamers, Strap Punches, Terminal Pullers, Steamers, Racks or Stands, Terminal Post Shapers, Battery Analyzer, Post Sealing Machine, Plate Burning Press, Prens and Stands.)
Pyratip. See General Elec Co.

TORCHES AND FURNACES

Acetylene, Alcohol, Gasoline, Kerosene.
Always Reliable. See Otto Bernz Co.
Bernz Co., Otto, Newark, N. J.
Dreadnaught. See Wall Mfg. Supply Co.
Jim Dandy. See Lasher-Weeber Co.
Klein & Sons, Mathias, Chicago, Ill
Lasher-Weeber Co., 262 Franklin, Boston, Mass.
McGill Mfg. Co., Valparaiso, Ind.

MATTATUCK PRODUCTS

SPRINGS
for
The Electrical Industry

Compression—extension
Spiral—torsion

Send specifications and quantities to Dept. 12

The Mattatuck Mfg. Co.
Waterbury Conn.

MATTATUCK PRODUCTS

ELCO MACHINE SCREWS

Are made by Specialists who know what a good screw should be, and also how to make them.

May we receive your inquiries?

ELCO TOOL & SCREW CORPORATION
1818 BROADWAY, ROCKFORD, ILLINOIS

TURBO OIL TUBING

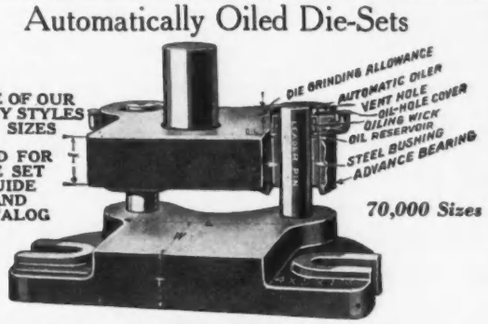
Impregnated inside and out —through-and-through protection against acids, gases, vapors, oils and moisture. Contains no nitro-cellulose— is slow-burning and possesses high dielectric strength.

In all sizes down as small as .020 or 1/2 m/m I. D. to insulate No. 25 B. & S. wire. Write for sample set.

WILLIAM BRAND & CO.
268 Fourth Avenue
New York, N. Y.

REPRESENTATIVES:
Chicago: J. J. Glenn & Co., 9 So. Clinton St.; Detroit: N. J. Clark & Co., 2885 East Grand Blvd.; Rochester: Gilbert Gislason, 124 Westchester Ave.; Hartford: Eugene P. Pack Co., 968 Farmington Ave.; Los Angeles: Lombard Smith & Co., 324 No. San Pedro St.

Automatically Oiled Die-Sets



ONE OF OUR MANY STYLES AND SIZES

SEND FOR DIE SET GUIDE AND CATALOG

70,000 Sizes

E. A. BAUMBACH MFG. CO.
GENERAL OFFICE AND WORKS
1810 South Kilbourn Ave., CHICAGO, ILLINOIS
Sales and Engineering Offices—Principal Cities U.S.A. and Canada

ZELLAC

ALL-PURPOSE Weatherproof Lacquer Grades

Zellac Outdoor Exposure Grades provide a surprisingly wide range of production uses. Manufactured in clear lacquers and glossy lacquer enamels, these and the supplementary grades, which are used when needed as primers and for sanding purposes, are designed to meet the requirements of practically any kind of outdoor exposure finishes. Where failure due to exposure in severe weather conditions offers a sales difficulty to lacquer-finished articles, Zellac Outdoor Exposure Grades will convert lost sales into sales-and-profit gains. Metal outdoor signs —automobile finishing and refinishing—traffic lights—heavy-duty outdoor electrical accessories—these suggest their numerous uses. And, above all, these grades notably exemplify the Zeller policy—"greater value in better results and lower production cost." Let us ship you a trial order of the type or types desired for comprehensive tests.

Zeller Lacquer Mfg. Co., Inc.
20 East 49th Street New York City

CHICAGO, LOS ANGELES, PORTLAND, WICHITA, SAN FRANCISCO, SEATTLE, DENVER

ZELLER

The FRANCE WIRE STRIPPER

A speedy machine for forced production. By a simple adjustment it will strip insulated wire and cord ends of varied sizes and types. Try the France on the basis of our unusual plan. Ask about it.
We also wind coils and manufacture coil winding and wire cutting machinery.

Junior Model

PATENTS 1,306,588 AND 1,433,320

THE FRANCE MANUFACTURING CO.
10306 Berea Rd., Cleveland, Ohio
Manufacturers Since 1913

TORCHES AND FURNACES—Continued
Peerless. See Lasher-Weeber Co.
Staysalite. See Klein & Sons, Mathias.
TORPEDO Cord. See Twine.
TORSION BALANCES. See Instruments, Laboratory Standard
TRANSFORMERS
Radio. See Radio Circuit Components.
Gas Tube Sign. See Transformers, Oil Burner.
Oil Burner Ignition. See Transformers, Low & Inter-

TRANSFORMERS, Low and Intermediate Voltage

For Oil Burners, Gas Tube Signs, and other special purposes.

Acme Elec. & Mfg. Co., 1439 Hamilton Ave., Cleveland, O.
American Bosch Magneto Corp., Springfield, Mass.
American Transformer Co., 178 Emmet, Newark, N. J.
Campbell Elec. Mfg. Co., 15 Stewart, Lynn, Mass.
Concourse Electric Co., 292 E. 137th, New York, N. Y.
Easton Coil Co., Bushkill Pike, Easton, Pa.
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
Forjos. See Motorless D. C. Neon Sign Co.
General Electric Co. (Merchandise Dept.), Bridgeport, Conn.
Jefferson Electric Co., 1500 S. Laflin, Chicago, Ill.
K-W Ignition Corp., 2811 Chester Ave., Cleveland, Ohio.
Kenyon Transformer Co., 122 Cypress Ave., New York, N. Y.
Mignon Elec. Corp., 909 Genesee, Buffalo, N. Y.
Motorless D. C. Neon Sign Co., 180 E. 123rd, New York. (Neon.)
Palmers Corp., Chas, 736 Broad, Newark, N. J.
Power Transformer Co., 145 W. 22nd, New York, N. Y.
Sorgel Electric Co., W. Water, Milwaukee, Wis.
Standard Transformer Co., Dana Ave., Warren, O
Uptigraff Mfg. Co., R. E., 5153 Stanton Ave., Pittsburgh.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
Webster Electric Co., Racine, Wis.

TRANSMISSION DRIVES. See Chain, Transmission.

TRANSMITTERS, Power

Controller drive giving a variety of speeds for use in connection with roll taping machines.

Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.
Segur. See Electric Service Supplies Co.

TROUBLE FINDERS. See Instruments, Portable and Switchboard; also Testers, Coil.
TRUCKS, Armature. See Lifts, Armature.

TRUCKS, Factory Steel

Angle Steel Stool Co., Plainwell, Mich.

TRUING Devices, Commutator. See Tools, Commutator.
TUBE (Tubes) (Tubing) Adapters. See Radio Receiver Parts.
Aluminum. See Aluminum.
Brass. See Tubing, Brass.
Condenser. See Tubing, Brass and Copper.
Copper. See Tubing, Brass.
Cutters. See Stocks, Dies, etc.
Fibre. See Fibre.
Fibre Candle. See Candles.
Mica. See Mica.
Nickel. See Tubing Nickel.
Paper. See Tubes, Paper.
Platinum. See Platinum.
Porcelain. See Porcelain.
Pyrometer. See Cores, Resistance.
Refractory. See Cores, Resistance.
Radio. See Radio Vacuum Tubes.
Varnished Fabric. See Tubing, Varnished Fabric.

TUBES, Paper; Cores; Sleeves, Bushings

Cleveland Container Co., 10330 Berea Rd., Cleveland, O.
Climax Tube Co., Mystic, Conn.
General Cable Corp., 420 Lexington Ave., New York, N. Y.
Klimaxcore. See Climax Tube Co.
McCausland, J. E., 86 Valley, Providence, R. I.
Fairpoint Corp., New Bedford, Mass.
Paper Tube Co., 1718 N. Damen Ave., Chicago, Ill.
Remington Mfg. Co., 939 Barnum Ave., Bridgeport, Conn.
Stone Paper Tube Co., Washington, D. C.
Textile Tube Co., Fall River, Mass. (Paper Sleeves.)

TUBING, Brass and Copper

American Brass Co., Waterbury, Conn.
Anaconda. See American Brass Co.
Baltimore Tube Co., 1301 Wicomico, Baltimore, Md.
Bridgeport Brass Co., Bridgeport, Conn.
Bull Dog. See National Elec. Products Corp.
Chase Brass & Copper Co., Waterbury, Conn.
Conklin Brass & Copper Co., T. E., 54 Lafayette, New York.
Cook, Dunbar Smith Co., 85 Sprague, Providence, R. I.
Dallas Brass & Copper Co., Div. of Revere Copper & Brass, Inc., 820 Orleans, Chicago, Ill.
French Mfg. Co., 128 Robbins, Waterbury, Conn.
General Cable Corp., 420 Lexington Ave., New York. N. Y.
Michigan Copper & Brass Co., Div. of Revere Copper & Brass, 5851 W. Jefferson Ave., Detroit, Mich.
Mueller Brass Co., Port Huron, Mich.
National Copper & Smelting Co., 1395 Coltman Rd., Cleveland, O.
National Elec. Products Corp., Inca Mfg. Div., Fort Wayne, Ind.
Relleum. See Mueller Brass Co.
Roberts Tube Works, 2500 Military Ave., Detroit, Mich.
Rome Hollow Wire & Tube Co., Div. of Revere Copper & Brass, Inc., Rome, N. Y.
Rome Turner Radiator Co., Rome, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
Summerill Tubing Co., Bridgeport, Pa. (also Nickel)
Torrington Mfg. Co., Torrington, Conn.
United Wire & Supply Co., 1497 Elmwood Ave., Providence
Wells Co., A. H., Watertown Ave., Waterbury, Conn.
Wolverine Tube Co., 1431 Central Ave., Detroit, Mich.

TUBING, Flexible Metallic

(Flexible Tubing.)
Almond Mfg. Co., T. R., Ashburnham, Mass.
American Metal Hose Co., Waterbury, Conn.
American Metal Moulding Co., Irvington, N. J.
Anaconda Wire & Cable Co., 25 Broadway, New York, N. Y.
Auto-Brassflex. See National Elec. Products Corp.
Auto-Steelflex. See National Elec. Products Corp.
Breeze Corp., Inc., 24 S. 6th, Newark, N. J.
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
Federal Metal Hose Corp., Buffalo, N. Y.
Fedmet. See Metal Hose Corp.
Fisher Spring Co., Chas., 238 Kent Ave., Brooklyn, N. Y.
Flexo Spring Mfg. Inc., 24 South First, Brooklyn, N. Y.

COILS
RADIO RELAY INDUCTANCE
MAGNET CLOCKS MEDICAL
TRANSFORMERS
To Your Specification 25 Watt to 5 K.V.A.
Have Us Quote You on Your Particular Requirements
Power Transformer Co., 145 W. 22nd St., New York

Cochrane's
WAXES
Compounds
Paints and Varnishes
for every insulation purpose
41 years in the business. Write for samples of our latest finishing and saturating wax.
Cochrane Chemical Company
Established 1887
432 Danforth Ave., Jersey City, N. J.

National Elec. Products Corp., Inca Mfg. Div., Fort Wayne, Ind.
Rinex. See United Metal Hose Co.
Sleeper & Hartley, Inc., Worcester, Mass.
Time-O-Stat Controls Co., Elkhart, Ind.
Titeflex Metal Hose Co., Newark, N. J.
Triangle Conduit Co., Dry Harbor Rd. and Cooper Ave., Brooklyn, N. Y.
United Metal Hose Co., 724 Garrison Ave., New York N. Y.
White Dental Mfg. Co. (Industrial Div.), S. S., 152 W. 42nd, New York, N. Y.

TUBING, NICKEL

National Harris Wire Co., 195 Verona Ave., Newark, N. J.

TUBING, Rubber

Rubber Tubing for Insulating Wire in Instruments and Telegraph Signal Lines.

Canfield Rubber Co., 702 Railroad Ave., Bridgeport, Conn
Eisler Electric Corp., 756 S. 13th, Newark, N. J.
Faultless Rubber Co., Ashland, O.
Goodrich Rubber Co., H. F., Akron, O.
Rubber-Vac. See Eisler Electric Corp.
Tyler Rubber Co., Andover, Mass.
Vulcanized Rubber Co., 251 Fourth Ave., New York, N. Y.

TUBING, Varnished Fabric

Insulating Tubing—Spaghetti.

Acme Wire Co., New Haven, Conn.
Alpha Wire Corp., 520 Broadway, New York, N. Y.
Bentley-Harris Mfg. Co., Conshohocken, Pa.
Brand & Co., William, 268 Fourth Ave., New York, N. Y.
Continental Diamond Fibre Co., Newark, Del.
Empire. See Mica Insulator Co.
General Electric Co., Section W-329, Bridgeport, Conn.
Goodrich Rubber Co., B. F., Akron, O.
Insulated Duct & Cable Co., Stokes, Trenton, N. J.
Insuline Corp. of America, 78 Cortlandt, New York, N. Y.
Lee Tire & Rubber Co., Conshohocken, Pa.
Mica Insulator Co., 200 Varick, New York, N. Y.
Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y.
Pearce Co., R. T., Covington, Ky. (Insulated Waxed Cotton.)
Turbo. See Brand & Co.
Varflex Corp., Rome, N. Y.

TURNED-UP BOXES AND CABINETS. See Cabinets, Sheet Steel.

TURNING TOOLS, COMMUTATOR. See Tools, Commutator Truing.

TWINE, Armature Winding; Torpedo Cord

Mitchell-Rand Mfg. Co., 19 Vesey, New York, N. Y.
Wirns & Son, Frank W., 42 N. Front, Philadelphia, Pa.

UNDERCUTTERS, Mica. See Slotting Machines & Tools, Commutator.
UNITS, Refrigerator Condenser. See Condenser Units, Refrigerator.

UNITS, Rods and Grids, Resistance

Acme Elec. Heating Co., Dept. B, 1217 Washington, Boston.
Allen-Bradley Co., 493 Clinton, Milwaukee, Wis.
Automatic Electric Heater Co., 1524 Race, Philadelphia, Pa
Bradleyunit. See Allen Bradley Co.
Buffalo Products Co., Broome & Lafayette Sts., New York
Burger, J. P., 1813 Columbus Rd., Cleveland, O.
Calrod. See Edison General Elec. Appliance Co., Inc
Chromalox. See Edwin L. Wiegand Co.
Clark Controller Co., 1146 E. 152nd, Cleveland, O.
Crown Coloring & Chemical Co., 33 W. 17th, New York.
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee.
Dalton Elec. Heating Co., 287 Bridge St., Salem, Mass.
Dalzac-Marsh Co., 86 Holten, Danvers, Mass.
Di-El-Ite. See Wirt Co.
Dixon Crucible Co., Jos., Monmouth, Jersey City, N. J.
Dur-ristor. See Cutler-Hammer, Inc.
Eagle Elec. Mfg. Co., 79 Hall, Brooklyn, N. Y.
Edgerest. See Industrial Controller Div.
Edgewound. See Monitor Controller Co.
Edison General Electric Appliance Co., Inc., 5600 W. Taylor, Chicago, Ill.
Edgewound. See Monitor Controller Co. & Clark Controller Co.
Elec. Controller & Mfg. Co., 2700 E. 79th, Cleveland, O
Elemite. See Louthan Mfg. Co.
Erie Resistor Corp., 644 W. Twelfth, Erie, Pa.
Fitz-All. See Rodale Mfg. Co.
F & M. See Hiram Marks Elec. Co.
General Electric Co., Schenectady, N. Y.
Globar Corp., Niagara Falls, N. Y.
Glo-Well. See Eagle Elec. Mfg. Co.
Gold Seal Elecl. Co. of Ohio, Inc., 250 Park Ave., New York, N. Y.
Hance-Parker Mfg. Co., 397 West Main, Meriden, Conn.
Hankscraft Co., 121 N. Dickinson, Madison, Wis. (Oven Heater Unit.)
Hardwick, Hindle, Inc., 216 Emmett, Newark, N. J.
Hexwound. See Monitor Controller Co.
Industrial Controller Div. of Square D Co., S. Pierce & Hanover Sts., Milwaukee, Wis.
Industrial Heater Co., 300 Canal, New York, N. Y.
International Resistance Co., 2006 Chestnut, Philadelphia, Pa.
Krischer's Mfg. Co., 255 Calyer, Brooklyn.
Louthan Mfg. Co., East Liverpool, O.
Marks, Elec. Co., Hiram, 304 Woodward Ave., Detroit, Mich.
Micamold Radio Corp., 1087 Flushing Ave., Brooklyn, N. Y.
Monitor Edgewound. See Monitor Controller Co. & Clark Controller Co.
Monitor Controller Co., 51 S. Gay, Baltimore, Md.
Nelco. See Nelson Electric Co.
Nelson Electric Co., Plant City, Fla.
Northern Electric Co., 2833 N. Western Ave., Chicago, Ill.
Ohmite Mfg. Co. 629 N. Albany Ave., Chicago, Ill.
Ohm-Spun. See States Co.
Op-Al Elec. & Mfg. Co., 1057 W. 20th, Indianapolis, Ind.
Parker & Co., J. C., 407 Bulletin Bldg., Philadelphia, Pa
Peloron Elec. Mfg. Corp., 26 Waverly Pl., New York, N. Y.
Presto Products Co., 520 Broadway, New York, N. Y.
Prometheus Elec. Corp., 360 W. 13th, New York, N. Y.

Pyrox. See Westinghouse Elec. & Mfg. Co.
Remco. See Reben Elec. Mfg. Co.
Repairall. See Waage Elec. Co.
Replaceall. See Waage Elec. Co.
Ribohm. See Ward Leonard Elec. Co.
Rubicon Co., 29 N. Sixth, Philadelphia, Pa.
Schaeffer Bros. Co., 1059 W. 11th, Chicago, Ill.
Seco. See Automatic Electric Heater Co.
Smith & Co., T. C., 3915 Powelton Ave., Philadelphia, Pa
Smoothwound. See Monitor Controller Co.
Snoco. See Snow & Co.
Snow & Co., E. W., 20 N. Water, Rochester, N. Y.
Stupakoff Laboratories, 6627 Hamilton Ave., Pittsburgh, Pa
Super. See Northern Elec. Co.
Superior Resistor Corp., 334 Badger Ave., Newark, N. J. (Radio)
United Metal Art Mfg. Co., 293 Wyckoff Ave., Brooklyn, N.Y
Vitrohm. See Ward Leonard Elec. Co.
Waage Elec. Co., 5100 W. Ravenswood Ave., Chicago.
Ward Leonard Elec. Co., Mt. Vernon, N. Y.
Warren Elec. Appliance Co., Warren, Pa.
Watlow Elec. Mfg. Co., 1320 N. 23rd, St. Louis, Mo.
Westinghouse Elec. & Mfg. Co., Mansfield, O.
White Dental Mfg. Co., S. S., 152 W. 42nd, New York N. Y. (Radio.)
Wiegand Co., Edwin L., 7530 Thomas Blvd., Pittsburgh, Pa
Wirt Co., 5221 Greene, Philadelphia, Pa.

VACUUM CLEANER BAGS. See Bags, Vacuum Cleaner.
VACUUM DRYING & IMPREGNATING OVENS. See Ovens, Industrial.

VALVES, Electrically Operated

Anderson Co., C. J., 212 W. Austin Ave., Chicago, Ill
Auto. See Automatic Switch Co.
Automatic Switch Co., 154 Grand, New York.
Automatic Temperature Control Co., 34 E. Logan, Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Chapman Valve Mfg. Co., Indian Orchard, Mass.
Crane Co., 836 S. Michigan Ave., Chicago, Ill.
Cutler-Hammer, Inc., 1288 St. Paul Ave., Milwaukee.
Electric Steam Radiator Co., 8th Ave & Virginia, Seattle, Wash.
Electric & Valve Mfg. Co., 64 Murray, New York, N. Y.
Electromatic Gas Control Corp., 1802 Columbus Rd., Cleveland, O.
Gas-Gard Co., 375 Main St., E., Rochester, N. Y. (Gas.)
General Electric Co., Schenectady, N. Y.
Golden-Anderson Valve Specialty Co., 1385 Fulton Bldg., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Minneapolis-Honeywell Regulator Co., 2753 Fourth Ave., Brooklyn, N. Y.
Michigan Metal Products Co., Battle Creek, Mich.
Nacco Mfg. Co., 1482 Clara Ave., St. Louis, Mo.
Northside Elec. Co., 4227 Spring Grove Ave., Cincinnati O
Nu-Way Water Heater Control, Inc., 368 Erie Bldg., Cleveland, O.
Preferred Utilities Mfg. Corp., 33 W. 60th, New York, N.Y.
Savutime Devices, Inc., 88 Manhattan, Rochester, N. Y.
St. Louis Motor Valve Co., St. Louis, Mo.
Sentinel. See Electric Steam Radiator Co.
Tagliabue Mfg. Co., C. J., 18-83rd St., Brooklyn, N. Y.
Teeple Co., L. R., 540 E. Ninth, Portland, Ore. (Gas.)
Time-O-Stat Controls Co., Elkhart, Ind.
Victor. See Lunkenheimer Co.
Zeco. See Zisch Engineering Corp.
Zisch Engineering Corp., 39 Avenue L, Newark, N. J. (Gas.)

VARNISH. See Paint, Varnish, Lacquer.
VARNISHED TAPE. See Tape, Varnished Fabric.
VARNISHED TUBING. See Tubing, Varnished Fabric.
VOLT BOXES. See Instruments, Laboratory Standard.
VOLTMETERS. See Instruments.
VULCANITE. See Rubber, Hard.
VACUUM PUMPS. See Pumps, Vacuum.

VULCANIZERS, WIRE INSULATION

American Insulating Machinery Co., 519 Huntington Ave. Philadelphia, Pa.
Biggs Boiler Works Co., Akron, Ohio.

WASHERS, FIBRE. See Fibre.

WASHERS, Lock

Washers, Non-Metallic. See also Gaskets, Fibre.

American Nut & Bolt Fastener Co., Pittsburgh, Pa.
Hobbs Mfg. Co., Worcester, Mass.
Kantlink. See National Lock Washer Co., Postitive Lock Washer Co., Mansfield Lock Washer Co., Reliance Mfg. Co. & American Nut & Bolt Fastener Co.
Keystone. See Positive Lock Washer Co.
Mansfield Lock Washer Co., Mansfield O.
National Lock Washer Co., 40 Hermon, Newark, N. J.
Positive Lock Washer Co., Ave. A & Miller, Newark, N. J
Reliance Mfg. Co., Massillon, O.
Shakeproof Lock Washer Co., 2533 N. Keeler Ave., Chicago.
St. Louis Malleable Casting Co., 7701 N. Conduit Ave., St. Louis, Mo.

WASHERS, Metallic

Bridgeport Brass Co., 774 E. Main, Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Hubbard Spring Co., M. D., Pontiac, Mich.
Massachusetts Machine Shop, Inc., Boston, Mass.
New England Screw Co., Dept. A., 44 Farnsworth, Boston
Quadrigs Mfg. Co., 213 W. Grand Ave., Chicago, Ill.
Russell Mfg. Co., John M., Naugatuck, Conn.
United Screw & Bolt Corp., Cleveland, O.
Wrought Washer Mfg. Co., 46 S. Bay, Milwaukee, Wis.

WATTMETERS. See Instruments.

WASHERS, Non-metallic

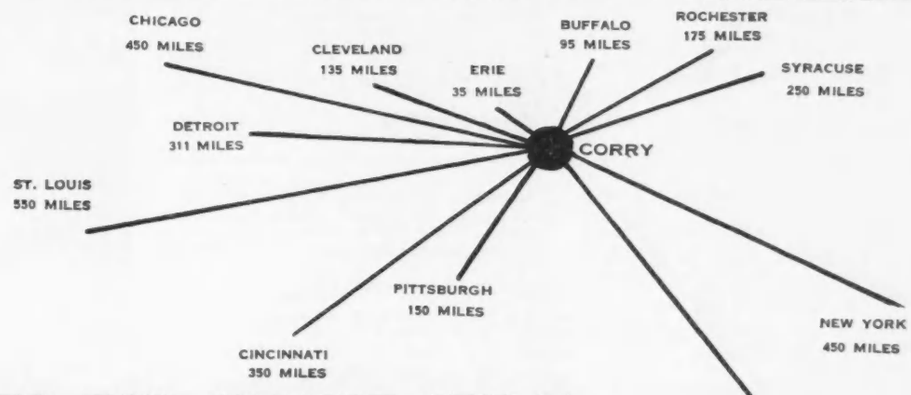
See also Gaskets, Fibre.

Michigan Leather Washer Co., 548 E. Fort, Detroit, Mich
Shakeproof Lock Washer Co., 2533 N. Keeler Ave., Chicago.

WAX AND COMPOUNDS

Wax and Compound, Sealing and Filling.....See Wax Junction Box, Potheads, Battery Tops, Bolt Head Holes
Wax and Compound.....See Saturating and Finishing, Braided Wire, Impregnating Fabric and Paper.
Chatterton's Compound.....See
Ackurate Rubber Co., 25 Beaver, New York, N. Y.
Alax. See Sherwin-Williams Co.
American Tar Products Co., Pittsburgh, Pa.
Asphalt Products Co., 6531 S. State, Chicago.

Fischerarm
The best in flexible arms for portable and therapeutic lamps, etc.
MADE of steel and brass in all Finishes. Special arms designed to your requirements.
Write for prices.
CHAS. FISCHER SPRING CO.
238 Kent Avenue Brooklyn, N. Y.



LOCATED FOR SERVICE

Within quick reaching distance of every manufacturer of electrical equipment or household convenience

EQUIPPED FOR SERVICE

With new and speedy automatic machinery especially adapted to the needs of the electrical industry

Why not send us your inquiries for—

Flat Springs

Coil Springs

Wire Forms · Small Stampings

RAYMOND MFG. CO.
CORRY, PA.

For Better Washers

ACTUAL SIZE

OF BRASS, STEEL AND COPPER
Highest quality—Low prices
Write Us

MASS. MACHINE SHOP, INC.
BOSTON, MASS.

CUT OPERATING COSTS

Without sacrificing quality or reducing existing wage schedules, you can cut operating costs by using KESTER Flux-Core SOLDERS. The flux in the core saves material, time and labor, yet insures a perfect soldering job. KESTER Acid-Core for general work; Rosin-Core for delicate wiring; Paste-Core for workers accustomed to paste. Specify KESTER.

From all Jobbers

KESTER SOLDER COMPANY
4210 Wrightwood Avenue Chicago

Incorporated 1899

KESTER FLUX-CORE SOLDER

ELEPHANT BRAND Phosphor Bronze

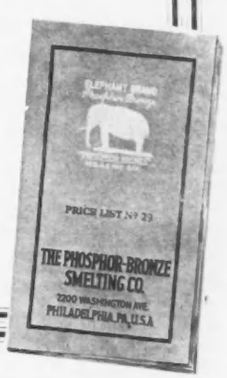
50 Years of Service proves its worth

For this period of time Elephant Brand Phosphor Bronze has been used with unfailing success by all industry.

This superior metal is made with extreme care in the selection of only the purest elements of composition.

There is a specific grade of Phosphor Bronze for every electrical requirement. You will find these various grades in our book "Price List No. 29." Send for it.

Elephant Brand Phosphor Bronze can be obtained in wire, ingots, rods, castings, tubes, sheets, or wire rope. Our "S" Bearing metal is flawless and resists friction.



THE PHOSPHOR BRONZE SMELTING CO.
2200 Washington Ave. Philadelphia, Pa.

Magnet Wire
Electrical Cordage
Rubber Covered Wire
Annunciator Wire
Bare Flexible Copper
Braids and Cables
Coils of All Types
The Wheeler Insulated Wire Co.
Bridgeport, Conn.

WAX AND COMPOUNDS—Continued
Bishop Wire & Cable Corp., 420 E. 25th, New York, N. Y. C
Biwax Corp., 208 S. La Salle, Chicago, Ill. ..... W S ..
Brand & Co., William, 268 Fourth Ave., New York, N. Y. ..... W ...
Bulls-Eye. See Zinsser & Co.
Cablelene. See Vacuum Oil Co.
Candy & Co., 35th and Maplewood Ave., Chicago W S ..
Cerowax. See Vacuum Oil Co.
Clifton Mfg. Co., 65 Brookside Ave., Boston C
Cochrane Chemical Co., 432 Danforth Ave., Jersey City, N. J. ..... W S ..
Dolph Co., John C., 168 Emmet, Newark, N. J. W ...
Di Electric Puttie. See Ackerate Rubber Co.
Ever-Protect. See National Cable Compound Co.
Flake White. See Williams Co., F. M.
General Electric Co., Section W-329, Bridgeport, Conn. ..... W ...
George Co., P. D., St. Louis ..... W ...
Globe Chemical Co., Murray Road & Big 4 R. R. St. Bernard, Cincinnati, O. ..... W S ..
Golde Brown. See Williams Co., F. M.
Great Lakes Thread & Yarn Co., Div. of General Cable Corp., 5133 Wesson Ave., Detroit ... W ...
Hercules Powder Co., 975 Market, Wilmington, Del. (Wood Resin) ..... S ..
Hexsulate. See American Tar Products Co.
Imco. See Great Lakes Thread & Yarn Co.
Indis Red Seal. See Williams Co., F. M.
Insulatine Co., 1 Broadway, New York ..... W ...
Insulation. See Vacuum Oil Co.
Knox & Morse Co., 80 Freeport, Boston, Mass. ..... W S ..
Leverite. See Mitchell-Rand Mfg. Co.
Lime Seal. See Mitchell-Rand Mfg. Co.
McGill Mfg. Co., Valparaiso, Ind. C
Minerallac Elec. Co., 1045 Washington Blvd., Chicago, Ill. ..... W ...
Mitchell-Rand Mfg. Co., 19 Vesey, New York ..... W S C
Mule-Hide. See Lehon Co.
National Cable Compound Co., Mitchell, Ind. ..... W ...
National Wax Co., 189 W. Madison, Chicago, Ill. .. S ..
Nu-Blac. See Star Porcelain Co.
Par Flexo. See Williams Co., F. M.
Rubberseal. See Mitchell-Rand Mfg. Co.
Rub-Flexo. See Williams Co., F. M.
Seidner & Enequist, Inc., 86 Hausman, Brooklyn, N. Y. ..... W ... C
Sherwin-Williams Co., Cleveland, O. ..... W ... C
Standard Varnish Wks., 433 4th Av., New York .. W ...
Standard Wax & Import Co., 110 E. 42nd, New York, N. Y. ..... W S ..
Star Porcelain Co., Trenton, N. J. ..... W .. C
Tacrite. See Seidner & Enequist, Inc.
Trotter & Co., E. T., 576 Johnson Ave., Brooklyn, N. Y. ..... W S ..
Vacuum Oil Co., 61 Broadway, New York, N. Y. W ...
Warner-Quinlan Co., 2 Park Ave., New York, N. Y. ... C
Waverly Oil Wks., 54th and A. V. R. R., Pittsburgh, Pa. ..... S ..
Williams Co., F. M., 1329 Prospect Ave., Brooklyn, N. Y.
Zinsser & Co., 48 Vesey, New York, N. Y. ..... W ...

WEBBING. See Tape, Cotton, Etc.
WEDGE DRIVERS. See Tools, Commutator.
WELDS. Lamp Lead-In. See Filaments, Incandescent

WELDING AND CUTTING OUTFITS

Electric Arc, Spot, Butt and Seam Metal Welders and Metal Cutting Outfits.
Acme Elec. Welder Co., 1850 W. Fulton, Chicago, Ill.
A. E. F. See American Electric Fusion Corp.
Agnew Electric Welder Co., Milford, Mich.
Allan Mfg. & Welding Co., Inc., 736 Washington, Buffalo.
Almanc See Allan Mfg. & Welding Co., Inc.
Alternarc. See Electric Arc Cutting & Welding Co.
American Elec. Fusion Corp., 2610 Diversey Ave., Chicago.
Ames Co., 115 9th, Brooklyn, N. Y.
Burke Electric Co., Erie, Pa.
Economy Electric Products Co., 2400 Woodland Ave., Cleveland, O.
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
Electric Arc Cutting & Welding Co., 156 Jelliff Ave., Newark N J.
Electric Welding, 744 Court, Brooklyn, N. Y.
Electric Welding Machine Co., 1530 Larned, E., Detroit.
Farwest Electric Welder Co., 1107 Northlake Ave., Seattle.
Federal Machine & Welder Co., Dana Ave., Warren, O.
Fleet-Weld. See Lincoln Elec. Co.
Flex-A-Weld. See Trumbull Elec. Mfg. Co.
General Electric Co., Schenectady, N. Y.
General Engrg. & Supply Co., 160 5th Ave., New York, N. Y.
Hansen. See Northwestern Mfg. Co.
Hobart Mfg. Co., Simpson & Penn Sts., Troy, Ohio
Hollup Corp., C. H., 3333 W. 48th Place, Chicago, Ill.
Lincoln Electric Co., Coit Rd. and Kirby Ave., Cleveland.
Lundy Co., E. A., Fulton Bldg., Pittsburgh, Pa.
Macleod Co., 2232 Bogen, Cincinnati, O.
McAdams Co., J. C., New Britain, Conn.
Nizg Engineering Corp., Second St. & Covina Blvd., Covina, Cal.
Northwestern Mfg. Co., 480 Clinton, Milwaukee, Wis.
Owen Elec. Mfg. Co., Fayetteville, N. C.
Plastic Arc. See Wilson Welder & Metal Co.
Pyrotip. See General Elec. Co.
Quasi-Arc, Inc., 11 W. 42nd St., New York, N. Y.
Rhason Mfg. Co., 124 45th, Union City, N. J.
Ryerson & Son, Jos. T., 2558 W. 16th, Chicago, Ill.
Sellars Arc Welder Co., 1200 Fourth Ave., Seattle, Wash.
Seneca Electric Welder Corp., 5907 Woodward, Detroit, Mich.
Siemund Wenzel Electric Welding Co., 79 Hancock, Long Island City, N. Y.
Swift Elec. Welder Co., 2567 W. Grand Blvd., Detroit.
Taylor-Winfield Corp., Mahoning Ave. Warren, O.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Toledo. See Thomson-Gibb Elec. Welding Co.
Trumbull Elec. Mfg. Co., Plainville, Conn.
Una Welding & Bending Co., 1615 Collamer Ave., Cleveland, O.
U. S. L. Battery Corp., Niagara Falls, N. Y.
Weldite. See Fusion Welding Corp.
Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Wilson Welder & Metal Co., Hoboken factory, Terminal Bldg., Hoboken, N. J.
Zeus. See Thomson-Gibb Elec. Welding Co.

WHEATSTONE BRIDGES. See Instruments, Laboratory Standard.

WICKS, Lubricating

Brawley Felt Co., Inc., T. R., 279 20th, Brooklyn, N. Y.

WINDERS
Armature & Field Coil. See Winding Machines, Armature & Field Coil.
Coil. See Winding Machines, Armature & Field Coil.
Electromagnet. See Winding Machines, Induction Coil.
Filament. See Machines, Lamp Making.
Induction Coil. See Winding Machines, Induction Coil.
Loop. See Winding Machine Armature & Field Coil.

WINDING MACHINES, Armature and Field Coil

Acme Elec. & Mfg. Co., 1447 Hamilton Ave., Cleveland, O.
Armature Coil Equipment Co., 2415 Forestdale Ave., Cleveland, Ohio.
Browning. See Mutual Foundry & Machine Co.
Chapman Electric Works, P. E., 1520 Chouteau Ave., St. Louis, Mo.
Columbia Machine Works & Malleable Iron Co., 283 Chestnut, Brooklyn, N. Y.
Comstock Mfg. Co., Wilkes-Barre, Pa.
Conran, Frederick M., 107 Colden, Newark, N. J.
Electric Service Supplies Co., 17th & Cambria Sts., Philadelphia, Pa.
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
Handy. See Armature Coil Equipment Co., 2415 Forestdale Ave., Cleveland, Ohio.
Herald Electric Co., 29 East End Ave., New York, N. Y
Hunsdorf, Wm., 2056 E. Fourth, Cleveland, O.
Liberty Starter Co., 241 Vinewood Ave., Detroit, Mich.
Meissner Mfg. Co., 523 S. Clinton, Chicago, Ill.
Mutual Foundry & Machine Co., Atlanta, Ga.
Oman, David W., 43 Royalstone Ave., Minneapolis, Minn.
Peerless. See Electric Service Supplies Co.
Ridlen Co., Frank, 253 A St., Boston, Mass.
Segur. See Electric Service Supplies Co.
Seifert, E. R., Syracuse, N. Y.
Superior. See Armature Coil Equipment Co.

WINDING MACHINES, Induction Coil

Acme Elec. & Mfg. Co., 1447 Hamilton Ave., Cleveland, O.
Belden Mfg. Co., 4633 W. Van Buren, Chicago, Ill.
Conran, Frederick M., 107 Colden, Newark, N. J.
Eureka Tool & Machine Co., 42 Walnut, Newark, N. J
Lessona. See Universal Winding Co.
Mignon Elec. Corp., 909 Genesee, Buffalo, N. Y.
Meissner Mfg. Co., 522 S. Clinton, Chicago, Ill.
Morris Register Co., 29th & Broadway, Council Bluffs, Iowa
Radio Production Machinery Co., 212 Centre, New York.
Seifert, E. R., Syracuse, N. Y.
Universal Winding Co., Boston, Mass.
Viking Tool & Machine Co., 745 65th, Brooklyn, N. Y.
Weehawken Engineering & Mfg. Co., 525 Gregory Ave., Weehawken, N. J.

WINDINGS. See Coils, Finished.

WINDOW SHADES, Factory

Athey Co., 5143 West 65th St., Chicago, Ill.

WIRE (Cable) (Cord), Aluminum. See Aluminum.
Copper Clad. See Wire, Copper Clad.
Forms. See Forms, Wire.
Frames. See Forms, Wire.
Fuse. See Fuses and Fuse Wire.
Lamp & Tube Filament. See Filaments, Incandescent Lamp.
Magnet. See Wire, Insulated.
Molybdenum See Molybdenum.
Phosphor Bronze. See Phosphor Bronze.
Platinum. See Platinum.
Radio Bus. See Wire, Bare.
Scrapers. See Strippers.
Strippers. See Strippers.
Tungsten. See Filament, Incandescent Lamp.

WIRE, Bare

Armature Banding	See B
Copper Wire	See C
Iron Wire	See S
Phosphor Bronze	See B
Radio Bus Wire	See C
Resistance Wire	See R
Steel Wire	See S

Acme. See Alloy Metal Wire Co.
Alpha Wire Corp., 520 Broadway, New York .. C R ..
Advance. See Driver Harris Co.
Alloy Metal Wire Co., Meore, Pa. ..... C R ..
American Copper Products Corp., 233 Broadway, New York, N. Y. ..... C R ..
American Electrical Works (Phillipsdale), Providence, R. I. ..... C ...
American Steel & Wire Co., 208 S. La Salle, ...
Anaconda Wire & Cable Co., 25 Broadway, New York, N. Y. ..... C ...
Ansonia Elect. Co., 55 Main, Ansonia, Conn.
Anylite Elec. Co., 200 Murray, Fort Wayne, Ind. .. C ...
Ballast. See Gilby Wire Co.
Baltimore Copper Mills, Div. of Revere Copper & Brass, Inc., Baltimore, Md. ..... C ...
Bassett Metal Goods Co., Derby, Conn. (General Sales Agent, Hatheway & Co., 16 Hudson, New York, N. Y. ..... C ...
Belden Mfg. Co., 4633 W. Van Buren, Chicago. .... C .. S
Beldenite. See Belden Mfg. Co.
Bradford, Kyle & Co., Plymouth, Mass. ..... R ..
Brandite. See Cornish Wire Co.
Brenvar. See General Cable Corp.
Bridgeport Brass Co. Bridgeport, Conn. ..... C ...
Calido. See Driver Harris Co.
Chase Brass & Copper Co., 236 Grand, Waterbury, Conn.
Chromel. See Hoskins Mfg. Co.
Chromic. See National-Harris Wire Co.
Climax. See Driver Harris Co.
Comet. See Driver Harris Co.
Cook Plate Co., Bdw. N., 70 Ship, Providence, R. I C ...
Copel. See Hoskins Mfg. Co.
Copperweld Steel Co., Glassport, Pa. ..... C .. S
Cornish Wire Co., 30 Church, New York, N. Y.. C ...
Corwico. See Cornish Wire Co.
Crescent Ins. Wire & Cable Co., Trenton, N. J.. C ...
Cromin. See Gilby Wire Co.
Cupron. See Gilby Wire Co.
1925. See Chicago Insulated Wire & Mfg. Co.
Driver-Harris Co., Harrison, N. J. ..... R ..
Electron. See Bassett Metal Goods Co.
Wreellcier. See Branford Elec. Co.
Fullman Mfg. Co., Latrobe, Pa. ....
General Cable Corp., 420 Lexington Ave., New York C .. S

GILBY WIRE GW GOOD COMPANY
ROUND and FLAT RESISTANCE WIRES
Complete line of nickel—chromium, copper nickel and other alloys—bare and covered, for every resistance need.
—GILBY WIRE—
COMPANY
Wilbur B. Driver, Pres., Newark, N. J.

Gilby Wire Co., Riverside Ave., Newark, N. J. ... R ..
Goldmark Co., James, 83 Warren, New York .. C ...
Hope Webbing Co., 1005 Main, Pawtucket, R. I. (Braided Wire Tape) ..... C ...
Hoskins Mfg. Co., 4445 Lawton Ave., Detroit, Mich. ..... R ..
Hudson Wire Co., Ossining, N. Y. ..... C R ..
Ideal. See Driver Harris Co.
Indiana Rubber & Insulated Wire Co., Jonesboro, Ind. ..... C .. S
Karma. See Driver Harris Co.
Keystone. See Fullman Mfg. Co.
Lucero. See Driver Harris Co.
Marion Insulated Wire & Rubber Co., Marion, Ind. C ...
Monax. See Standard Alloy Wire Co.
National-Harris Wire Co., Newark, N. J. ..... R ..
Nichrome. See Driver Harris Co.
Novar. See Standard Alloy Wire Co.
Ohmoloy. See Gilby Wire Co.
Page Steel & Wire Co., Bridgeport, Conn. ..... S
Peerless. See Alloy Metal Wire Co.
Phono-Electric. See Bridgeport Brass Co. & Standard Underground Cable Co.
Premier. See Alloy Metal Wire Co.
Providence Insulated Wire Co., Providence, R. I.. C ...
Revolute Wire Co., Hastings-on-Hudson, N. Y.... C ...
Rice Co., A. H., Pittsfield, Mass. ..... C ...
Roebling's Sons Co., John A., Trenton, N. J. ..... C .. S
Ross Wire Co., 69 Bath, Providence, R. I. ..... C ...
Seneca Wire & Mfg. Co., Fostoria, O. ..... S
Silicrimp. See Valley Narrow Fabric Co.
Silectron. See Standard Alloy Wire Co.
Solar. See Gilby Wire Co
Spargo Wire Co., J. A., Rome N. Y. ..... C ...
Standard Alloy Wire Co., Div. of National-Harris Wire Co., Newark, N. J. ..... R S
Superior. See Alloy Metal Wire Co.
Talking Tape. See Hope Webbing Co.
Therlo. See Driver Harris Co.
Tophet. See Gilby Wire Co.
Tru-Lay. See Page Steel & Wire Co.
Valley Narrow Fabric Co., 59 Chestnut, Central Falls, R. I
Wheeler Insulated Wire Co., Bridgeport, Conn.. C ...

WIRE CLOTH. See Cloth, Wire.

WIRE, Copper Clad

Copperweld Steel Co., Glassport, Pa.
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
General Cable Corp., 420 Lexington Ave., New York, N. Y.

WIRE SOLDER. See Solder, Bar and Wire.

WIRE DRAWING MACHINES

Drawing and Re-drawing Mill Equipment for Small Wires
American Insulating Machinery Co., 519 Huntington Ave., Philadelphia, Pa.
Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
Sleeper-Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio.
Wire Machinery Corp. of Am., New Haven, Conn.

WIRE FORMING MACHINE

Seifert, E. R., Syracuse, N. Y.

WIRE, Insulated

	KEY
Annunciator, Office, Bell Wire	See A
Asbestos Covered Heater Cord	See H
Asbestos Covered Magnet Wire	See M
Enameled Magnet Wire	See M
Fixture Wire	See B
Flexible Reinforced Heavy Duty Cord	See F
Heater Cord	See H
Ignition Cable	See R
Lamp Cord	See B
Radio Cord	See R
Rubber Covered Wire & Cable	See R
Stove Wire	See H
Telephone Cord	See T

AA. See General Cable Corp.
A-1 Brand. See General Cable Corp.
Amelectric. See American Elec. Wks.
American Braiding Co., Holyoke, Mass. B ...
American Copper Products Corp., 233 Broadway, New York, N. Y. ...
American Electrical Works (Phillipsdale), Providence, R. I. ..... W L
American Insulated Wire Corp., 45 Baker, Providence, R. I. ..... R F .. A T ..
American Steel & Wire Co., 208 S. La Salle, Chicago, Ill. ..... R F H A T ..
Americore. See American Steel.
Amerite. See American Steel.
Amerixe. See American Steel.
Amparak. See American Steel.
Anaconda Wire & Cable Co., 25 Broadway, New York, N. Y. ..... R F .. A ...
Ansonia Electrical Co., Ansonia, Conn. (Silk Cotton Enameled) ..... A ...
Armorlokt. See American Steel.
Bay State Insulated Wire & Cable Co., Paydras (Mattapan) 26, Boston ..... B ...
Belden Mfg. Co., 4633 W. Van Buren, Chicago, Ill. ..... R F H A T ..
Birnbach Radio Co., 254 W. 31st, New York, N. Y. ..... B ...
Bishop Wire & Cable Corp., 420 E. 25th, New York, N. Y. ..... R F ...
Boston Insulated Wire & Cable Co., 65 Bay, Boston, Mass. ..... R F H ...
Cablex. See Collyer Insulated Wire Co.

ALUMINUM

AND aluminum-alloys are finding new usages in the electrical industry through the cooperation of our engineers with manufacturers. The results of this cooperation have proved most satisfactory and economical.

Irregardless of how seemingly complicated your problem may be, tell us about it and we will submit suggestions relative to the possible application of aluminum or aluminum alloys to that problem.

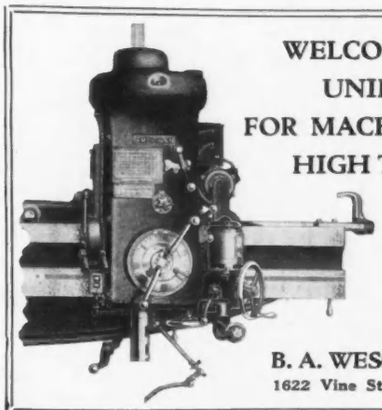
ALUMINUM ALLOYS
Sheets
Coils
Circles

FAIRMONT ALUMINUM COMPANY

Branch Sales Offices
New York: 52 Vanderbilt Avenue
Chicago: Monadnock Block
Detroit: General Motors Building
Buffalo: A. J. Fitzgibbons, Mgr., 47 W. Northrup Pl.

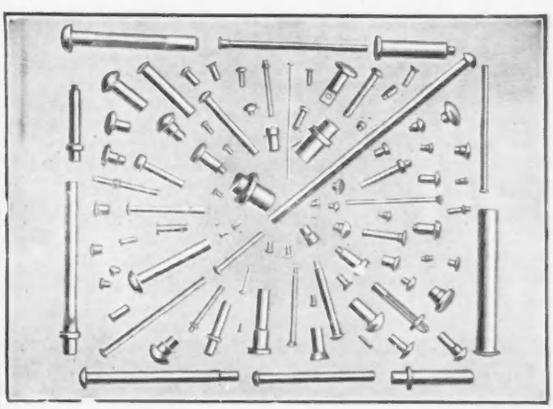
ALUMINUM ROLLING MILLS
Fairmont, W. Va.

Warehouse Distributors
Central Steel and Wire Company, Chicago
Chas. A. Sterlinger Co., Detroit.
J. M. & L. A. Osborn Co., Cleveland.
Ducommum Corporation, Los Angeles and San Francisco.



WELCO MOTORS
UNIFRAME
FOR MACHINE TOOLS
HIGH TORQUE,
TRAVERSE,
CLAMP
DUTY OUR
SPECIALTY.

B. A. WESCHE ELEC. CO.
1622 Vine St., Cincinnati, Ohio



PARAGON DIE CASTINGS

ALUMINUM—ZINC—TIN and LEAD BASE

A new plant, new equipment, but old, ripe experience behind every detail of our specialized work. Let us submit quotations—our advice will not obligate you.

Paragon Die Casting Co.
2701 N. Crawford Ave.
Chicago

SPECIAL STUDS

SPECIAL SCREWS

MACHINE SCREWS

MACHINE SCREW NUTS

THERE is an immense amount of satisfaction enjoyed by us through the fact that on our books are the names of leaders in industry who continue to place their business with us.

There is only one reason—their requirements are accurately and PROMPTLY attended to.

Is your name on that list?

THE PROGRESSIVE MFG. CO.
Torrington, Conn.

WIRE, Insulated—Continued
Celasite. See Acme Wire Co.
Collyer Insulated Wire Co., Pawtucket.. R F H . . . . .
Colorbeston. See General Elec. Co.
Colorubber. See Belden Mfg. Co.
Condex. See Simplex Wire Co.
Contact Cable. See Bishop Wire & Cable
Copperweld Steel Co., Glassport, Pa..... R . . . . . T . .
Cotenamel. See Belden Mfg. Co.
Cottonite. See Acme Wire Co.
Crescent Braid, Inc., Providence, R. I.. . . . . H . . . . .
Crescent Ins. Wire & Cable Co., Trenton. R F H A T . .
Crescord. See Crescent Ins. Wire & Cable Co.
Davis-Jones Insulated Wire Co., Pawtucket, R. I. ..... R F H A T . .
Deltabeston. See York Insulated.
Diamond Braiding Mills, Chicago, Heights R F H . . . . .
Di-Noburn. See Diamond Braiding Mill. delphia, Pa.
Dolphin. See General Cable Corp.
Dreadnaught. See Indiana Rubber Co.
Driver-Harris Co., Harrison, N. J..... R . . h . . . .
Ducatto. See General Cable Corp.
Durabilt. See Anaconda Wire & Cable Co.
Duracord. See Anaconda Wire & Cable Co.
Durawire. See Anaconda Wire & Cable Co.
Duro. See McEvoy, C. H.
Eagle. See Goldmark Co., James.
Eastern Insulated Wire Co., Tilton, N. H. R . . . . . .
1885. See Chicago Insulated Wire.
Enamelite. See Acme Wire Co.
Enterite. See General Cable Corp.
Fibrex. See Simplex Wire Co.
Flexible Woven Cable Co., 755 Boylston, Boston, Mass. ..... F . . . . .
Flex-O-Cord. See Packard Elec. Co.
Gavitt Mfg. Co., Brookfield, Mass..... T . .
GE-Flex. See General Elec. Co.
General Cable Corp., 420 Lexington Ave., New York, N. Y. ..... R F H A T W
General Elec. Co., Section W-329 Bridgeport, Conn. ..... R F H . . . . .
Giant. See Collyer Insulated Wire.
Gilby Wire Co., Riverside Ave., Newark, N. J. ..... H . . . .
Globe Insulated Wire, 148 Old Colony Ave., Wollaston, Mass. ..... R . . . . . .
Goldmark Co., James, 83 Warren, New York, Annunciator and Asbestos, Cotton, Silk ..... A . . . .
Goodyear Rubber Insulating. See Graybar Electric Co
Graybar Elec. Co., Graybar Bldg., Lexington Ave. & 43rd St., New York, N. Y. R . . . . . T . .
Grimshaw. See New York Ins.
Hatex. See Hatfield Rubber Wks.
Hatfield Rubber Wks., Inc., Hillside & Long Aves., Hillside, N. J..... R F H . . T . .
Hazacord. See Hazard Insulated Wire Works.
Hazard Insulated Wire Works, Div. of Okonite Co., Wilkes-Barre, Pa.... R F . . A . . . .
Holyoke Co., 621 Broadway, New York. R . . . . A . . . .
Indiana Rubber & Insulated Wire Co., Jonesboro, Ind. ..... R F H . . . . .
I. X. L. See Collyer Insulated.
Kable. See General Cable Corp.
Kenrite. See General Cable Corp.
Kerite Ins. Wire Cable Co., 30 Church, New York, N. Y. ..... R . . . . .
Kilo Co., 2 E. 23d, New York, N. Y. . . . . T . .
Koelle, Frederick C., Real Estate Trust Bldg., Philadelphia, Pa. ..... T . .
Lowell Insulated Wire Co., Lowell, Mass. R F H . . . . .
Liberty. See Nat. Elec. Products Corp.
Loxsteel. See Hazard Insulated Wire Works.
McEvoy, C. H., Lowell, Mass..... R . . . . . T . .
Marion Insulated Wire & Rubber Co., Marion, Ind. ..... R F H A T . .
Montgomery Co., J. R., Windsor Locks, Conn. ..... T . .
Nagy. See Bishop Wire & Cable Corp.
National Elec. Products Corp., Inca Mfg. Div., Fort Wayne, Ind..... R F H A T . .
National-Harris Wire Co., Newark, N. J. R . . . . . .
Neptune. See General Cable Corp.
New England Elec. Wks., Lisbon, N. H.. R . . . . . .
N. E. See New England Elec. Wks.
New York Insulated Wire Co., 114 Liberty, New York, N. Y. ..... R . . . . . .
Nitro. See Belden Mfg. Co.
O. K. See General Cable Corp.
Okocord. See Okonite Co.
Okonite Co., Passaic, N. J..... R . . . . . .
Ozex. See Simplex Insulated Wire
Packard Electric Co., Warren, O..... R F . . . . . .
Parac. See General Cable Corp.
Paracore. See U. S. Rubber Co.
Paraflex. See Bishop Wire & Cable.
Paranite. See Indiana Rubber.
Parkerite. See Seward Wire Co.
Pec. See Packard Elec. Co.
Philadelphia Insulated Wire Co., 200 N. Third, Philadelphia, Pa.... H A T . .
Providence Insulated Wire Co., Providence R F H A . . . .
Pyroproof. See Hatfield Rubber Works, Inc.
Raven Core. See New York.
Reliance. See American Steel.
Riga. See Birnbach Radio Co.
Rockbestos Products Corp., 369 Nicoll, New Haven, Conn. ..... R . . H . . T . .

Roebling's Sons Co., John A., Trenton, N. J. ..... R F H A T . .
Rosa Wire Co., 69 Bath, Providence, R. I.. R . . . . . .
Romoxide. See General Cable Corp.
Ruffcoat. See General Cable Corp.
Salamander. See York Insulated.
Seward Wire Co., Parkersburg, W. Va. R . . . . . .
Silkenamel. See Belden Mfg. Co.
Silkenite. See Acme Wire Co.
Simcore. See Simplex Wire.
Shield. See Ansonia Elec'l Co.
Simplex Wire & Cable Co., 201 Devonshire, Boston, Mass. ..... R F H . . T . .
Spiralweave. See Hazard Ins. Wire
Standard Alloy Wire Co., Div. of National-Harris Wire Co., Newark, N. J. . . . H . . . . .
Sterling. See General Cable Corp.
Sterling Insulated Wire Co., Fall River, Mass. ..... R . . . . . .
Super-Service. See General Cable Corp.
Tip-Top. See General Cable Corp.
Tirex See Simplex Wire & Cable.
Trenchlay. See General Cable Corp.
Triangle Conduit Co., Dry Harbor Rd. & Cooper Ave., Brooklyn..... R . . . . . .
Triton. See General Cable Corp.
Tubular Woven Fabric Co., Pawtucket, R. I. ..... R F . . . . . .
United States Rubber Co., 1790 Broadway New York, N. Y. ..... R . . H A T . .
U. S. Royal. See United States.
Waldman Mfg. Co., 127 Blackstone, Providence, R. I. ..... R . . . . . T . .
Warrior. See American Copper.
Wheeler Insulated Wire Co., Bridgeport, Conn. ..... R F H . . T . .
White, J. M., 1123 Olive, Philadelphia, Pa. ..... R F H . . T . .
Whitney Blake Co. See Graybar Electric Co.
Wovenite. See Flexible Woven.
York Insulated Wire Wks. of G. E. Co., 120 Broadway, New York, N. Y..... R . . H . . . . .

WIRE, Magnet

Acme Wire Co., New Haven, Conn.
Alpha Wire Corp., 520 Broadway, New York, N. Y.
Amalac. See Direct Line Telephone Co.
American Electrical Works (Phillipsdale) Providence, R. I.
American Steel & Wire Co., 208 S. La Salle, Chicago, Ill.
Anaconda Wire & Cable Co., Maring Wire Branch, Muskegon, Mich.
Ansonia Electrical Co., Ansonia, Conn.
Belden Mfg. Co., 4633 W. Van Buren, Chicago, Ill.
Bradford, Kyle & Co., Plymouth, Mass.
Celatsite. See Acme Wire Co.
Cotenamel. See Belden Mfg. Co.
Cottonite. See Acme Wire Co.
Crescent Ins. Wire & Cable Co., Trenton, N. J.
Ducatto. See General Cable Corp.
Electric Auto-Lite Co., Port Huron, Mich.
Enamelite. See Acme Wire Co.
Fawcett, Hughes, Inc., 115 Franklin, New York, N. Y.
General Cable Corp., 420 Lexington Ave., New York, N. Y.
Goldmark Co., James, 83 Warren, New York, N. Y.
Holyoke Co., 621 Broadway, New York, N. Y.
Inland Wire & Cable Co., Sycamore, Ill.
Kilo Co., 2 E. 23rd, New York, N. Y.
Massachusetts Electric Mfg. Co., West Lynn, Mass.
National Elec. Products Cor., Inca Mfg. Div., Fort Wayne, Ind.
New England Electrical Works, Lisbon, N. H.
Revolute Wire Co., Hastings-on-Hudson, New York.
Rockbestos Products Corp., New Haven, Conn.
Roebling's Sons Co., John A., Trenton, N. J.
Strand & Sweet Mfg. Co., Winsted, Conn.
Sweetstrand. See Strand & Sweet Mfg. Co.
Varflex Co., Rome, N. Y.
Wheeler Insulated Wire Co., Bridgeport, Conn.
Winsted Insulated Wire Co., Winsted, Conn.
York Insulated Wire Wks. of G. E. Co., 120 Broadway, New York, N. Y.

WIRE MANUFACTURING MACHINES

(See Also Wire Drawing Machines; Insulation Mixers; Taping Machines, Wire; Wire Polishing Machines; Enameling Machines for Magnet Wire; Wire Wrapping Machines; Vulcanizers, Wire Insulation.)

Armoring Machines ..... See A
Braiding Machines ..... See B
Bunching Machines ..... See S
Covering Machines ..... See I
Insulating Machines ..... See I
Insulation Straining Machines..... See I
Measuring Machines ..... See M
Park Cabling Machines..... See A
Saturating Tanks ..... See F
Spooling Machines ..... See U
Stranding Machines ..... See S
Tinning Tanks ..... See F
Winding Reels ..... See U

Adamson Machine Co., Akron, Ohio.. I A . . . . . .
Aimee-Seward. See American Insulating Machinery Co.
American Insulating Machinery Co., 519 Huntington Ave., Philadelphia, Pa. I A . . . . S U F
Breguet. See American Insulating
Crescent. See Royle & Sons, John.
Durant Mfg. Co., 662 Buffum, Milwaukee, Wis. ..... M . . U . .

Eisler Electric Corp., 770 S. 13th, Newark, N. J. ..... U . .
Fidelity Machine Co., 3908 Frankford Ave., Philadelphia, Pa. ..... B . . . . . .
Housatonic Machine & Tool Co., Bridgeport, Conn. ..... I . . . . . U . .
Minneapolis Elec. & Construction Co., 80 S. 12th St., Minneapolis, Minn. ..... M . . U . .
Nebutteo. See New England Butt Co.
New England Butt Co., 324 Pearl, Providence, R. I. ..... I A B M S U .
Peerless. See Royle & Sons, John.
Robertson Co., John, 121 Water, Brooklyn, N. Y. ..... A . . . . . .
Royle & Sons, John, Paterson, N. J. I . . . . . .
Sleeper & Hartley, Inc., Worcester, Mass. ..... A . . . . S U
Terkelsen Machine Co., Terkelson Bldg., Boston, Mass. ..... M . . . . .
Textile Machine Works, Reading, Pa. . . . . B . . . . . .
Universal Wire Machy. Co., 69 Daggett, New Haven, Conn. ..... A . . . . . U F
Utility Mfg. Co., Cudahy, Wis..... I . . . . . .
Wardwell Braiding Machine Co., Central Falls, R. I. ..... B . . . . . .
Watson Machine Co., 74 Railroad Ave., Paterson, N. J. ..... I . . . . . .
Wire Machinery Corp. of Am., New Haven, Conn. ..... M S U . .
Weir. See Housatonic Machine

WIRE POLISHING MACHINES

(See Also Wire Manufacturing Machines).
American Insulating Machinery Co., 519 Huntington Ave., Philadelphia, Pa.
New England Butt Co., 324 Pearl, Providence, R. I.

WIRE, Steel Flat

Steel Coating for Armored Conductor.
American Steel & Wire Co., 208 S. La Salle, Chicago, Ill.
Crescent Insulated Wire & Cable Co., Trenton, N. J.
Roebling's Sons Co., John A., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, O.

WIRE STRAIGHTENING MACHINES

Eisler Electric Corp., 770 S. 13th St., Newark, N. J.
Franklin Mfg. Co., New Haven, Conn.
Kane & Roach, Syracuse, N. Y.
Shuster Co., F. B., New Haven, Conn.
Seifert, E. R., Syracuse, N. Y.

WIRE TAPING MACHINES. See Taping Machines, Wire

WIRE VULCANIZING MACHINES. See Vulcanizers

WIRE WRAPPING MACHINES

Terkelsen Machine Co., Terkelsen Bldg., Boston, Mass.

WOOD BLOCKS. See Cabinets & Boxes, Wood.
Boxes. See Cabinets & Boxes, Wood
Cabinets. See Cabinets & Boxes, Wood
Pulleys. See Pulleys, Composition.
Woods Metal. See Radio Mountings.

WRAPPERS, Paper. See Boxes and Wrappers.

WRAPPERS, Tungsten Lamp. See Boxes and Wrappers.

YARN AND THREAD; Silk, Cotton, Asbestos

Allbestos Corp., 21st & Godfrey Ave. (Germantown), Philadelphia, Pa.
Ambler Asbestos Shingle & Sheathing Co., Ambler, Pa.
American Asbestos Co., Norristown, Pa.
American Glanzstopf Corp., 180 Madison Ave., New York.
Anchor Thread Co., Trenton (Grovesville), N. J.
Columbian Rope Co., Auburn, N. Y.
Commercial Rayon & Thread Co., 19 W. 21st, New York.
Ferodo & Asbestos, Inc., New Brunswick, N. J.
Fiorsheim, H. A., 225 Fifth Ave., New York, N. Y.
Franklin Rayon Corp., 86 Crazy, Providence, R. I.
General Electric Co., Schenectady, N. Y.
Great Lakes Yarn & Thread Co., Div. of General Cable Corp., 5133 Wesson Ave., Detroit, Mich.
Johns-Manville Corp., New York, N. Y. (Asbestos.)
Kubar Mfg. Co., Davidson, N. C.
Lees Mfg. Co., 320 Broadway, New York, N. Y.
Multiple Winding Co., 77 Summer, Boston, Mass.
Rich & Co., H. S., 180 S. Water, Providence, R. I.
Ryle & Co., Wm., 381 Fourth Ave., New York, N. Y.
Silkslip. See Worcester Bleach & Dye Wks. Co.
Smith & Dove Mfg. Co., Andover, Mass. (Linen Thread.)
Worcester Bleach & Dye Wks., Worcester, Mass.

ZINC

Bunker Hill. See St. Joseph Lead Co.
Horse Head. See New Jersey Zinc Co.
New Jersey Zinc Co., 160 Front, New York, N. Y.
Platt Bros. & Co., Waterbury, Conn. (Strips.)
St. Joseph Lead Co., 250 Park Ave., New York, N. Y.
United Metals Selling Co., 25 Broadway, New York, N. Y.

ZINCS AND COPPERS, Battery

Bunker Hill. See St. Joseph Lead Co.
Bunnell & Co., J. H., 215 Fulton, New York, N. Y.
Edes Mfg. Co., Plymouth, Mass.
Extruded Metal Corp., 184 53rd, Brooklyn, N.Y. (Zinc Cups.)
Franklin. See Grasselli Chemical Co.
Grasselli Chemical Co., Guardian Bldg., Cleveland, O.
Illinois Zinc Co., Peru, Ill.
Lind Mfg. Co 70 Wyckoff Ave., Brooklyn, N.Y. (Zinc Cups.)
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Co., 160 Front, New York, N. Y.
St. Joseph Lead Co., 250 Park Ave., New York, N. Y

1/12 of the Nation's Population!

Nearly 12,000,000 people live in the New York market and their electrical needs are served by readers of METROPOLITAN ELECTRICAL NEWS . . . the newspaper of all electrical dealers, dealer-contractors, contractors, and jobbers in the New York Metropolitan district.

Back up your national advertising to this market—gain new impetus—win greater product acceptance among these electrical factors of Metropolitan New York.

Metropolitan Electrical News.

A Gage Publication

The Market Price of

PLATINUM

is still low!

Today the price of PLATINUM is the lowest since 1915. Electrical manufacturers, whose products employ contact points, can now utilize the advantages of PLATINUM more economically.

The advantages of PLATINUM are multitudinous, though heretofore, the price limited its extensive use in contact points.

Let the WILCO organization work out your contact point problems. As specialists in this line, there is an answer ready for you.

WILCO

THE H. A. WILSON CO., NEWARK, N. J.

Refiners and Workers of Platinum, Silver and Other Precious Metals

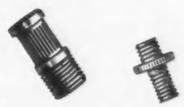
WILCO Thermostatic Metals for low temperatures and high temperatures

Chicago Office—5 S. Wabash Ave.

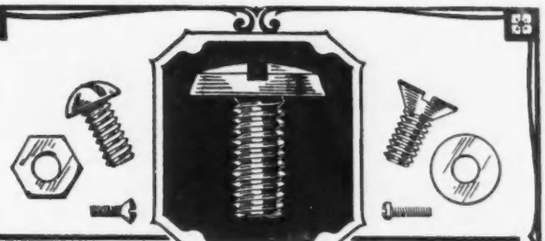
Quick Service on
SCREW MACHINE
PRODUCTS

—accuracy, too, on anything made of from 1/16" to 1-5/8" round or from 1/8" to 1-1/2" hex. stock—to specifications. Send samples or blueprints.

D. M. WATKINS COMPANY
270 Pine St. Providence, R. I.



Since
1895



All kinds of Electrical Screws carried in stock

WRITE FOR PRICES

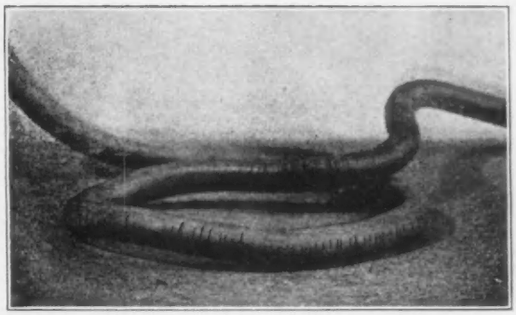
NEW ENGLAND SCREW CO.

DEPT. A

44 FARNSWORTH ST. BOSTON, MASS.

"ANOROC"

Solves the ozone problem for rubber insulated high tension cables



The usual methods of attempting to solve the corona and ozone problem in relation to cable insulation, to prevent ozone cuts such as are shown in the illustration, have been with metallic shields, protective coverings or with so called ozone proof, ozone resisting or ozone repelling insulation.

To obtain positive, dependable results the problem must be attacked from the opposite angle. Formation of corona and ozone can be controlled by using properly designed cables insulated with "ANOROC", (corona from the opposite angle) a new type of rubber insulation, which positively prevents the formation of corona and ozone in or about a cable at normal operating voltage. The efficacy of this method of protecting cable insulation from ozone has been amply demonstrated by laboratory tests fully substantiated by actual service under operating conditions.

"ANOROC" insulation retains all of the electrical, chemical and physical properties which have made rubber the most adaptable and desirable insulation for cables.

Further information and details of tests are contained in a recent Simplex publication entitled "Corona Prevention and Ozone Elimination". May we send a copy to you?

Patent applied for.

SIMPLEX WIRE & CABLE Co

MANUFACTURERS

201 DEVONSHIRE ST., BOSTON

BRANCH SALES OFFICES

CHICAGO, 564 W. Monroe St. SAN FRANCISCO, 390 Fourth St.
NEW YORK, 1328 B'way CLEVELAND, 2019 Union Trust Bldg.
PHILADELPHIA, 1227 Fidelity-Philadelphia Trust Building
JACKSONVILLE, 417 Barnett National Bank Building

ACME STRIP STEEL

for
Electrical Manufacturing

A full range of sizes in hot and cold rolled strip steel, all tempers and finishes including Electro-Galvanized. Furnished in long length coils or cut lengths, for stamping, forming and deep drawing.... The Acme Mills are geared to supply the largest users, and flexible enough to take care of the needs of the small buyer. Let us quote on your requirements.

SAVE WITH STEEL

1880 ACME STEEL COMPANY 1930
OUR GOLDEN ANNIVERSARY

Hot and Cold Rolled Strip Steel

General Offices:
2832 Archer Avenue . . Chicago

ATLANTA
BROOKLYN
DETROIT
MILWAUKEE
LOS ANGELES
SAN FRANCISCO
SEATTLE
MONTREAL

23

ELECTRITE

A high grade fibre board for electrical insulation.

A material of quality possessing high tensile and dielectric strength.

Tested and approved by the Underwriters' Laboratories.

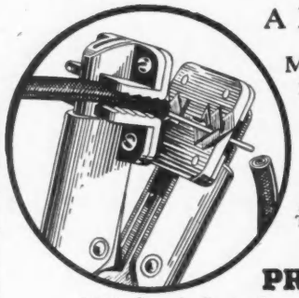
Pulp Products Department

WEST VIRGINIA PULP & PAPER COMPANY

230 Park Avenue
New York, N. Y.

35 East Wacker Drive
Chicago, Ill.

E-Z WIRE STRIPPER

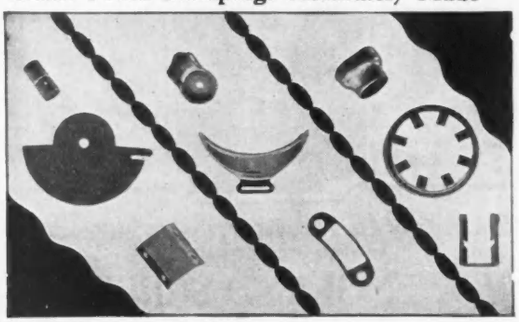


A HANDY TOOL
for all
MANUFACTURERS

Here is a tool that will save you time and money, speed up production and lower your costs.
This inexpensive tool strips wire of 10 to 20 gauge 20 times faster than usual methods. Give it a trial on a money back guarantee. Thousands in use.

PYRAMID PRODUCTS CO.
2311 South State St., Chicago, U. S. A.

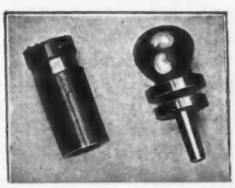
Small Metal Stampings Accurately Made



PATTON-MacGUYER CO. — Providence, R. I.

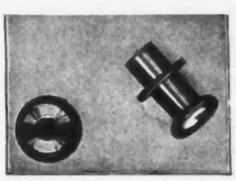
PECK SPRINGS

Springs as fine as spiralled hair or big husky giants that cushion Pullmans—all industry has come to Spring Headquarters for years because the uniformity of Peck quality never varies from the high mark we have established.



Great stocks of spring material insure immediate action on any rush or urgent order.

AUTOMATIC SCREW MACHINE PARTS



We make these in brass, bronze, nickel, silver or steel—any size up to 1¼ in. diameter.
Let us estimate on your needs.

THE PECK SPRING COMPANY
Plainville, Conn.

CHACE
THERMOSTATIC METAL
"It Bends With the Heat"

An accurate, consistent and durable bi-metal for temperature responsive devices up to 1500° F. Mill sheets or finished form. Consult our Eng. Dept.

Manufactured by
W. M. CHACE VALVE COMPANY
1608 BEARD AVE. - DETROIT, MICH.

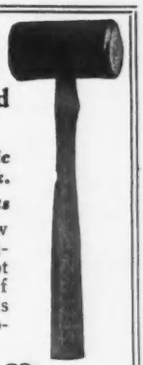
Chicago Rawhide

Mallets and Rawhide-Faced Hammers

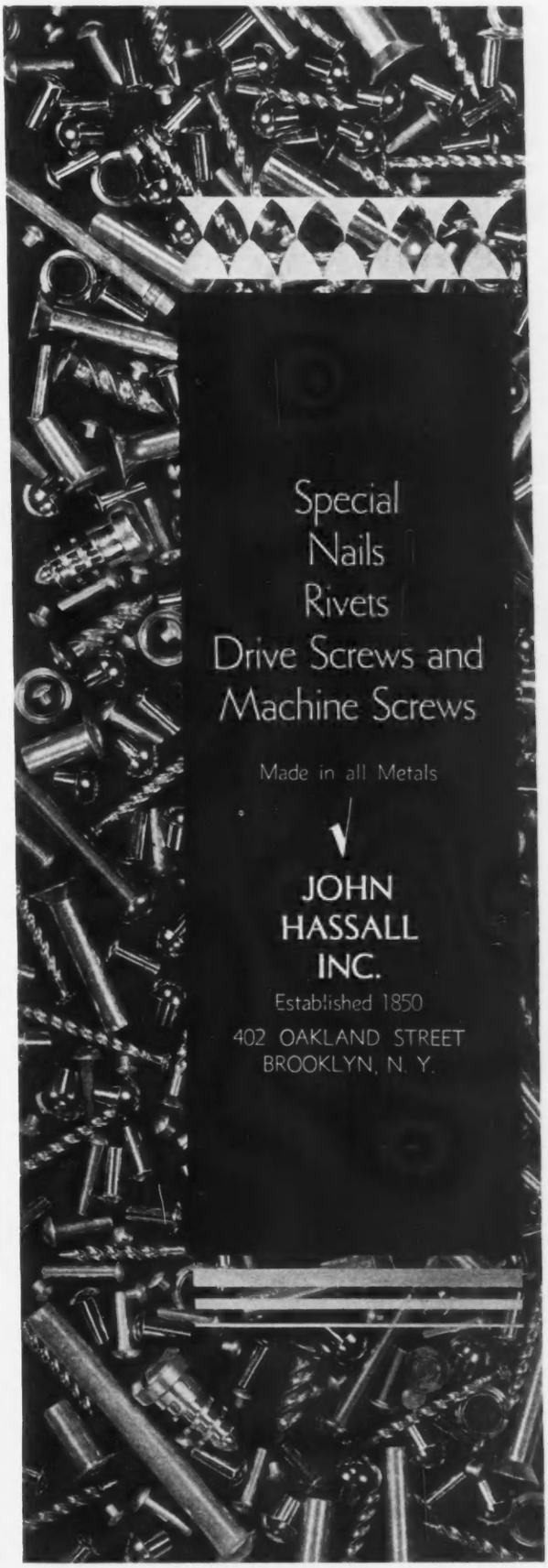
Used extensively in electric motor assembly and repair work.

Saves Battered-Up Motor Parts

Will transmit an effective blow without damage to the most delicate surface. The blow is not more destructive to the tool itself than to the object to which it is applied—therefore, doubly economical.



THE CHICAGO RAWHIDE MFG. CO.
1287 Elston Ave., Chicago, Ill.



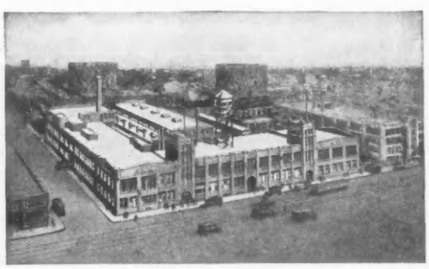
The *right* Spring costs no more

DEPENDABILITY of springs as a part of your product is of more importance to you than initial cost. All things considered, when a spring is essential to the operation of any device the best is the cheapest, regardless of first cost.

GIBSON-SPRINGS

COMPRESSION EXTENSION
TORSION FLAT
ANY MATERIAL OR QUANTITY
ANY STYLE OR SIZE
ALSO LIGHT STAMPINGS

WM. D. GIBSON CO.
1800 CLYBOURN AVE.
CHICAGO
ILL.



UNIVERSAL
Automatic Coil Winding Machinery

LEESONA

UNIVERSAL coil winders have been designed and developed by an organization specializing in winding machinery since 1892. Six distinct types of machines are available—to produce any required type of coil, spool-wound or self-supporting, cotton or paper insulated. Entirely adjustable for various sizes of coils, these machines never become obsolete. The many special features and automatic controls insure precision-wound coils at lowest possible cost.

UNIVERSAL WINDING COMPANY
BOSTON

Manufacturers of coil winding equipment covering practically every phase of the electrical industry

Good Factory Site Available

Located within 25 miles of Albany and 17 miles of Schenectady.

Labor conditions favorable with several small villages and farming community to draw upon.

Water supply good.

Village board will cooperate with financially responsible manufacturers.

For further information address L. L. D., care of Electrical Manufacturing, Box 72.

SMALL MANUFACTURING ESTABLISHMENT
WANTED

Must be cheap. Give details in first letter.
Address Box 263.

Pure Zinc for Fuse Elements

Strip Zinc for Commercial Uses

Eyelets Standard & Special

Large Articles Made on Multiple Plunger Press

The Platt Bros. & Co.
Waterbury, Conn.

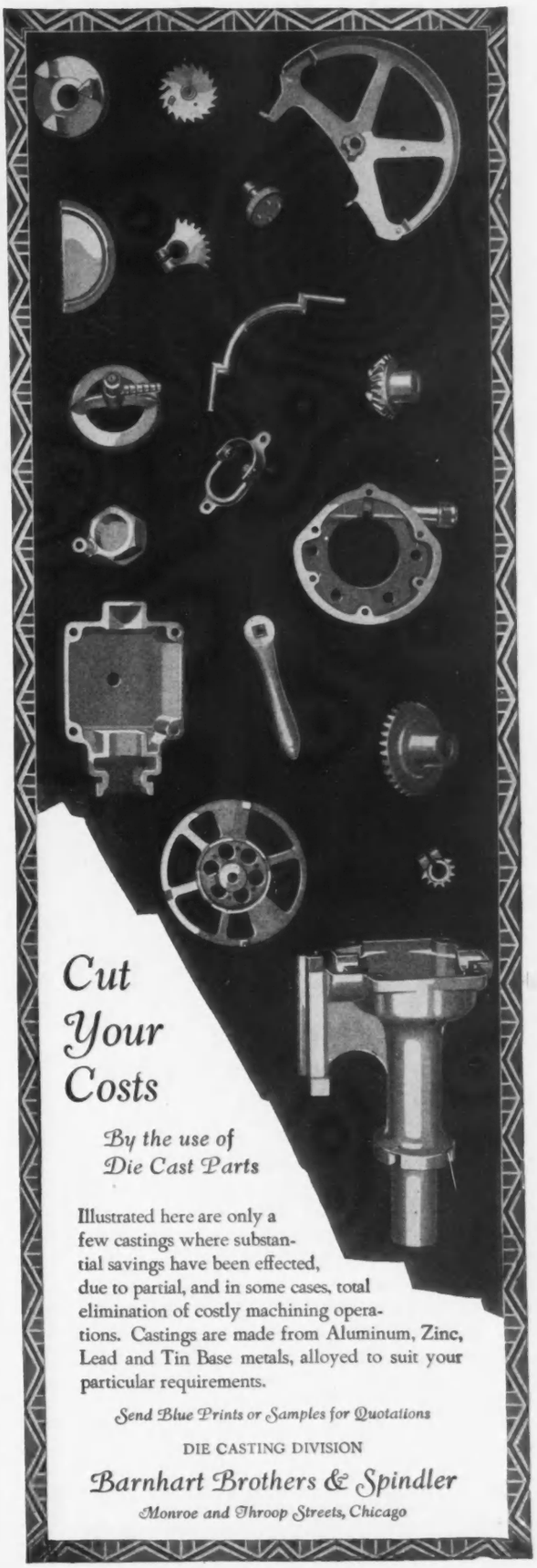
BEAD CHAIN *for* ELECTRIC FIXTURES

Dependability

From the standpoint of quality, uniformity, and prompt delivery, dependability has made Bead Chain the standard of the industry.

THE BEAD CHAIN MANUFACTURING CO.
BRIDGEPORT CONNECTICUT

Albert Lorsch & Co., Inc., Sales Agents
607 Fifth Avenue
New York City



Cut Your Costs

By the use of Die Cast Parts

Illustrated here are only a few castings where substantial savings have been effected, due to partial, and in some cases, total elimination of costly machining operations. Castings are made from Aluminum, Zinc, Lead and Tin Base metals, alloyed to suit your particular requirements.

Send Blue Prints or Samples for Quotations

DIE CASTING DIVISION
Barnhart Brothers & Spindler
Monroe and Throop Streets, Chicago

AICO'S
SUCCESS IN MEETING THE NEEDS OF ALL INDUSTRY FOR MOULDINGS OF MANY COMPOSITIONS, IN MYRIADS OF SHAPES AND SIZES, TO THE HIGHEST DEGREE OF ACCURACY AND UNIFORMITY, IS DUE TO AN INFLEXIBLE AICO RULE THAT INSISTS ON FOLLOWING SPECIFICATIONS TO THE LETTER.
COLD MOULDED AND PHENOLIC PRODUCTS
Beetle Lumarith
Braylite
AMERICAN INSULATOR CORP.
NEW FREEDOM PA.
SALES OFFICES:
New York Bridgeport Chicago Detroit

Advertisers

Acme Steel Co. 136
Acme Wire Co., The 127
Advance Spring & Wire Co. 107
Aga Auto Lamp Co., Inc. 119
Akron Porcelain Company, The 101
Allen Co., Inc., L. B. 122
Allied Die Casting Corp., The 119
Aluminum Co. of America 26
Ambler Asbestos Shingle & Sheathing Co. 71
American Brass Co. 79
American Felt Co. 101
American Insulator Corporation 140
American Lava Corporation 95
American Record Corp. 87
Anaconda Wire & Cable Co. ..... Front Cover
Angle Steel Stool Co. 107

Bakelite Corporation 33
Baker & Company, Inc. 114
Barnes Co., The Wallace 121
Barnes-Gibson-Raymond, Inc. 125
Barnhart Brothers & Spindler 139
Baumbach Mfg. Co., E. A. 129
Bead Chain Mfg. Company, The 139
Belden Mfg. Company ..... Inside Front Cover
Benjamin Electric Manufacturing Co. 114
Biddle, James G. 106
Black & Decker Elec. Co. 13
Bodine Electric Co. 9
Boonton Moulding Co. 108
Boonton Rubber Mfg. Co. 89
Brand & Company, William 129
Brandywine Fibre Products Co. 97
Brawley Felt Co., Inc., T. R. 107
Brevolite Lacquer Co. 112
Burgess & Company 101

Cameron Elec'l Mfg. Co. 117
Candy & Company, Inc. 93
Carlander, Henry 121
Case Brothers, Inc. 91
Century Electrical Co. 106
Chace Valve Co., W. M. 128, 137
Chicago Gear Works 104
Chicago Moulded Products Corp. 97
Chicago Rawhide Mfg. Co., The 137
Cochrane Chemical Co. 130
Coils, Inc. 119
Colonial Insulator Company 95
Consumers Rubber Co., The 102
Continental-Diamond Fibre Co. 69
Cook Pottery Company 106, 110, 114
Cooke Seal Ring Co. 87
Crowe Name Plate & Mfg. Co. 21

Davis Slate & Mfg. Company 122
Delbee Rubber Co. 91
Diemolding Corp. 108
Dolph Company, John C. 112
Driver-Harris Co. 99
Dumore Company, The 14
Dunn Inc., Struthers 94, 111
Dunning & Boschert Press Co., Inc. 114

Egyptian Lacquer Mfg. Co., The 29
Elco Tool & Screw Corp. 129
Electric Clock Corp. of America 111
Electric Specialty Co. 109
Electrical Refractories Co., The 105
Electrical Specifications 96
Electrical Testing Labs. 117
Electro Dynamic Co. 113

Fairmont Aluminum Co. 133
Fansteel Products Co., Inc. 109
Fast & Company, John E. 93
Federal Bearings Co., Inc., The 8
Fischer Spring Co., Chas., The 124, 130
Formica Insulation Co., The 4
France Mfg. Co., The 129
Franklin Die Casting Corp. 98

General Cable Corp. 25
General Electric Co. 28, 36
General Electric Vapor Lamp Co. 85
General Etching & Mfg. Co. 110
General Plastics, Inc. 73
George Co., P. D., The 117
Geuder, Paeschke & Frey Co. 31
Gibson Co., Wm. D. 138
Gilby Wire Company 132
Gits Bros. Mfg. Co. 123
Globar Corp. 35
Gray Bros., Inc. 98
Gurney Ball Bearing Division Marlin-Rockwell Corp. 15

Hassall, Inc., John 137
Hatfield Rubber Wks., Inc. 77
Hinde & Dauch Mfg. Co. 19-20
Hunter Pressed Steel Co. 124

Ideal Commutator Dresser Co. 127
Ilsco Copper Tube & Products, Inc. 121
Impervious Varnish Co. 112
Interstate Products Corp. 123

Johnson & Johnson 125

Kendrick & Davis Co. 113
Kenyon Transformer Co., Inc. 117
Kester Solder Co. 131
Kuhn & Jacob Machine & Tool Co. 93
Kurman Eng. Corp. 99

Lee Spring Co., Inc. 124
Leland Electric Co., The 111
Linden & Company 120
Louthan Mfg. Co., The 75
Lowell Insulated Wire Co. 107

Mass & Walstein Co. 107
Maehler Co., The Paul 105
Madison-Kipp Corp. 22
Marlin-Rockwell Corp. 15
Mass. Machine Shop, Inc. 131
Master Electric Co., The 3
Mattatuck Mfg. Co., The 129
Meissner Mfg. Co. 100
Metropolitan Elec. News 134
Mica Insulator Company 30
Mitchell-Rand Mfg. Co. 93
Mullins Mfg. Corp. 121
Munsell & Co., Eugene 87

National Vulcanized Fibre Co. 103
New Departure Mfg. Company, The 11
New England Screw Co. 135
New Jersey Zinc Co., The ..... Back Cover
New Yorker Hotel, The 125
Newton Die Casting Corp., The 24
Niagara Mach. & Tool Wks. 115
Nolu Oilless Bearing Co. 94
North American Elec. Lamp Co. 108
Norton Laboratories, Inc. 89

Ohio Elec. Mfg. Co., The 109
Ohmite Mfg. Co. 93
Olson Mfg. Company 120

Paragon Die Casting Co. 133
Parker-Kalon Corp. ..... Inside Back Cover
Patton-MacGuyer Co. 136
Peck Spring Co., The 137
Penn-Union Elec. Corp. 128
Phoenix Die Casting Co. 98
Phosphor Bronze Smelting Co., The 131
Platt Bros. & Co., The 139
Portland-Monson Slate Co. 122
Power Transformer Co. 130
Progressive Manufacturing Co., The 133
Pyramid Products Co. 136

Raymond Mfg. Co. 131
Riegel Paper Corp. 97
Robbins & Myers, Inc. 10
Robertson-Davis Co. 100
Rubicon Co. 127
Ruby Chemical Co., The 122
Russell Electric Co. 106

Sargent, Lester L. 112
Schmidt, Inc., Geo. T. 123
Seifert, E. R. 107
Sevison Magneto Engineering Co. 100
Shakeproof Lock Washer Co. 18
Shaw Insulator Company 110
Sherman Mfg. Co., H. B. 123
Signal Elec. Mfg. Co. 117
Simplex Wire & Cable Co. 135
Spaulding Fibre Co., Inc. 32
Standard Steel & Bearings, Inc. 12
Star Porcelain Company, The 105
Steinen & Company, William 120
Stewart Die Casting Corp., The 27
Stokes Rubber Co., Jos. 99
Stone Paper Tube Co. 91
Synthane Corporation 34

Technical Products Co. 98
Terkelsen Machine Co. 103
Thomas & Sons Co., The R. 103
Torrington Co., The 7
Toycraft Rubber Co., The 93

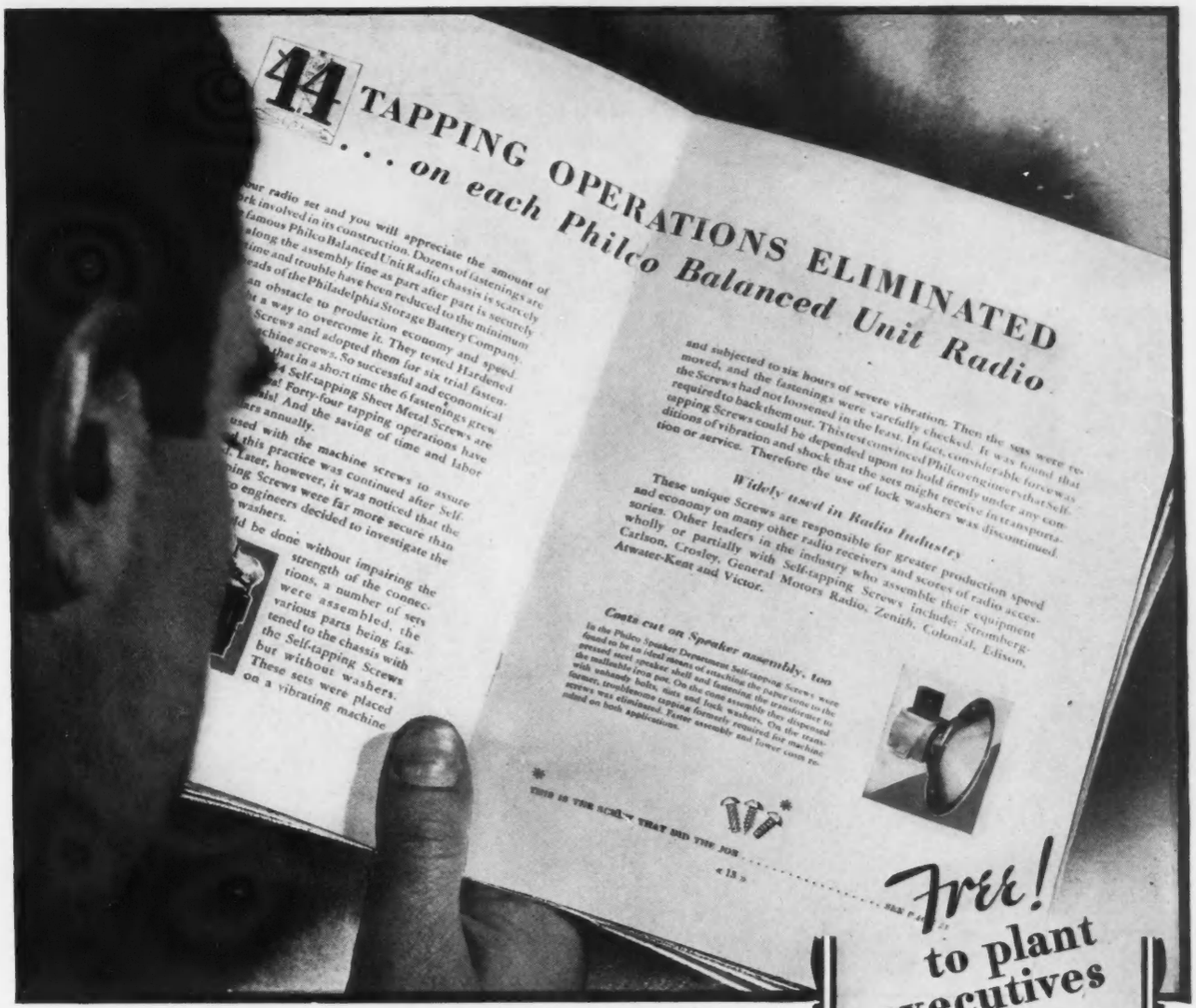
United Screw & Bolt Corp. 83
Universal Winding Company 138

Varley Duplex Magnet Co. 102

Wagner Electric Corp. 6
Ward Leonard Electric Co. 113
Watkins Co., D. M. 135
Wesche Electric Co., B. A. 133
West Virginia Pulp & Paper Co. 136
Western Felt Works 102
Weston Elec'l Instrument Corporation. 16
Wheeler Insulated Wire Co., The 132
Whitman & Barnes, Inc. 17
Wiegand Co., Edwin L. 81
Wilcolator Co., The 115
Wilmington Fibre Specialty Co. 95
Wilson Co., H. A., The 135
Wire Stripper Co., The 123
Wolverine Tube Co. 117

Young Brothers Co. 23

Zapon Co., The 99
Zeller Lacquer Mfg. Co., Inc. 129
Zobell Elec. Motor Co. 110


44 TAPPING OPERATIONS ELIMINATED
. . . on each Philco Balanced Unit Radio
Widely used in Radio Industry
Costs cut on Speaker assembly, too
Free!
to plant executives

"Every Man *concerned with production* should read it"

. . . says a prominent production engineer

Any man concerned with the production of a product made wholly or partly of metal will find this new booklet, "Fastenings—How they are made by leaders in the metal working industries," most interesting reading. The chances are, too, that he will obtain from it information of considerable value to his own work.

This booklet contains accurate descriptions of the ways in which greater fastening economy has been attained on the Servel Refrigerator, Philco Radio, Hotpoint Range, Ford Trimotor Plane, Simmons Metal Furniture, Zenith-Detroit Carburetor and other well known products. All of the facts and figures given, were secured through fastening studies made by independent engineers in the plants of fourteen of the most prominent concerns in their respective fields.

"Fastenings" will be sent free of cost or obligation to any plant executive. It is only necessary to fill in the coupon and attach it to your letterhead.

PARKER-KALON *Hardened* Self-tapping Screws

PARKER-KALON CORPORATION
Dept. K, 190-204 Varick St., New York, N. Y.

Send a free copy of "Fastenings" marked to the personal attention of:

Name and Title.....

Company .....

Street and City.....

HORSE HEAD *UNIFORM QUALITY* ZINC

Fuel Pump die cast from an alloy of Horse Head—*uniform quality*—Zinc.

Consistent, uniform performance . . . meeting the needs for fuel supply under all operating conditions . . . made the fuel pump standard automotive equipment. ¶ Naturally the fuel pump manufacturer must be as certain of the uniform performance of the Zinc he uses in die casting the pump . . . Reliability, precision and economy of die castings all depend on the uniform quality of the metal. ¶ The maker of die castings who uses Horse Head—*uniform quality*—Zinc is certain.

THE NEW JERSEY ZINC COMPANY

160 FRONT STREET, NEW YORK CITY

Zinc Metal and Alloys ▪ *Rolled Zinc* ▪ *Zinc Pigments* ▪ *Sulphuric Acid* ▪ *Spiegeleisen*